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April 2016

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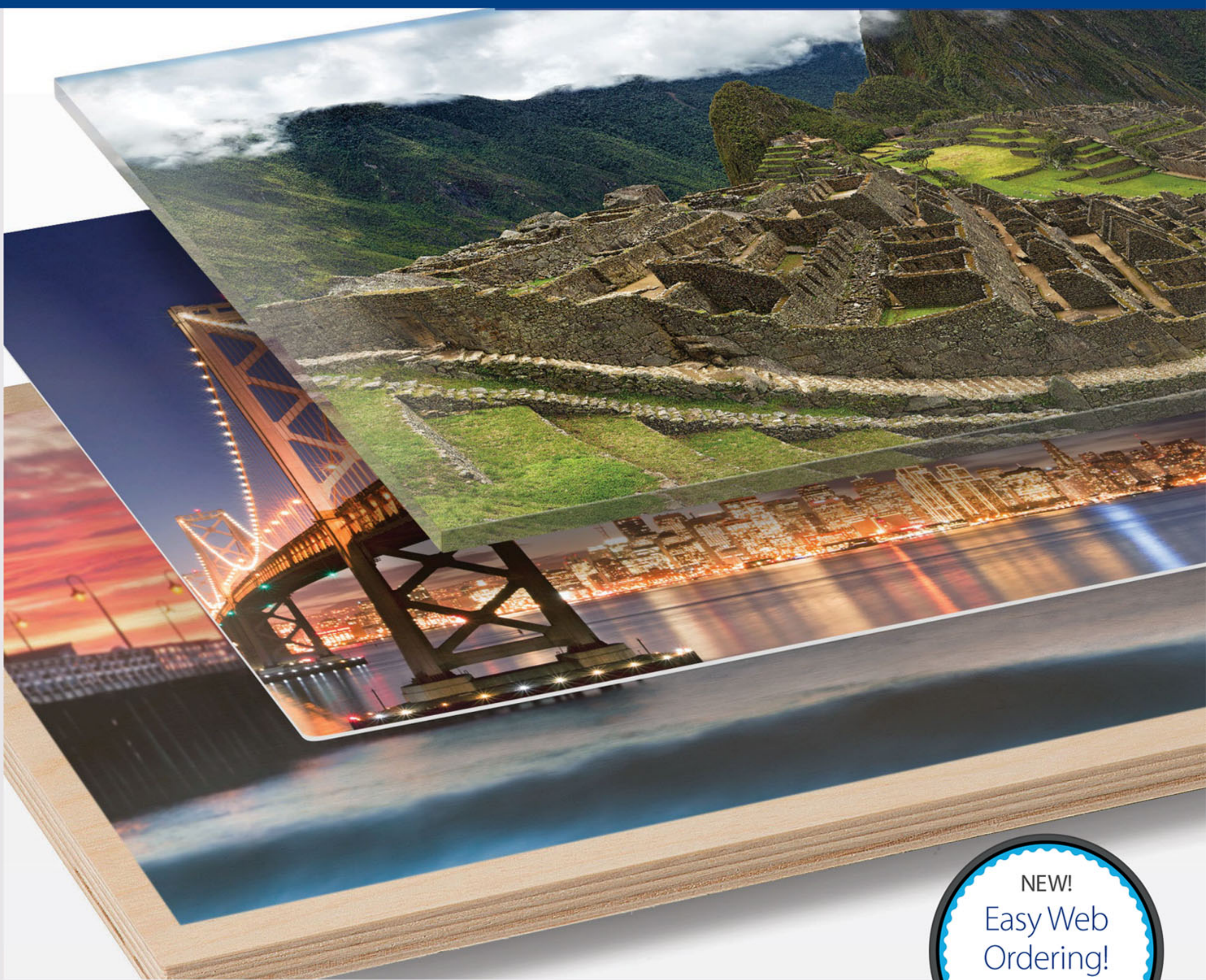


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IN A DIGITAL WORLD



Photo © 2016 Gianluca Colla | FUJIFILM X-Pro2 Camera and XF14mmF2.8 R Lens at 0.5 sec at F5.0, ISO 400

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• EQUIPMENT •

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Photographer: Melissa Groo

Location: Brooktondale, New York

Equipment: Canon EOS-1D Mark IV, Canon EF 500mm f/4L IS USM, Canon Extender EF 2X III

Situation: I've looked for bobcats for years where I live in upstate New York, hoping to photograph this elusive animal. Although they live all across our country, the only sign many people will ever see are their tracks in snow. Last year, I traveled out to Yellowstone National Park, as I knew that one or two bobcats usually could be found there in winter along the Madison River in West Yellowstone, Montana. My friends and I successfully found and photographed a bobcat multiple times, and I left the park feeling I had achieved my goal.

A few weeks later, back at home, I received a tip about a bobcat at a deer carcass a few miles away. I jumped in my car and headed to the location. There turned out to be a family of three: a mother bobcat and her two young, taking turns feeding at the carcass in a streambed near the road (the cover shot depicts the mother). I was able to photograph them from my car and not disturb their meal. At times, they would retreat farther back from the carcass to rest, and I was able to observe their relationship to one another as they pressed close, nuzzling each other with obvious affection.

To know that such wildlife lives near me, and to have documented intimate moments in the life of a family, is a once-in-a-lifetime experience I'll always treasure. It also holds out an important lesson—you don't have to travel far to experience miraculous moments in nature.

—Melissa Groo



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In a Long Island, New York saltmarsh, a yellow-crowned night heron makes a catch—crab with salad.

Melissa Groo

recently attended a lecture given by Frans Lanting about his project “LIFE: A Journey Through Time.” For those not familiar with the work, Lanting set out “...looking for situations in the natural world that provide a window on its past,” to create a collection of photographs that would illustrate the origins and history of life on this planet. The result is a visually stunning body of work that offers fascinating insights into the interconnectedness of all living things. You can learn more about this project, explore a timeline of life and view the photographs at www.lanting.com/experience.html.

Lanting recalled a moment photographing macaws in Peru when he realized that local species can serve as “ambassadors of ecosystems.” His eloquent description struck me as particularly meaningful as we were finishing work on this issue. Wildlife photography reconnects us to the natural world, revealing the striking similarities we share. In her article “Wildlife Biographer,” **Melissa Groo** describes how she first became involved with wildlife photography as a profession while working as a research assistant at Cornell University. “For two field seasons, we lived in the Central African Republic to study elephants in the wild,” writes Groo. “There I learned that what we know about wild animals is only the tip of the iceberg, that theirs is a world as complex as our own, though in a myriad of different ways.”

Through images that reveal the relationship of wildlife with their habitats and with each other, we learn to appreciate how important human stewardship is in maintaining the delicate balance of life, and that photography can play a powerful role in guiding us. “Wildlife photography is a critically important tool to build appreciation for, and remind us of, our rich natural heritage,” **Michael Forsberg** proposes in his article “Wildlife of the Great Plains.” Reconciling human needs and those of wildlife isn’t always easy, but it’s possible—commercial and ecological interests aren’t insurmountably opposed. “Most of the land here is in private ownership,” says Forsberg, “but that doesn’t necessarily mean it’s not managed for conservation. Many ranchers

and farmers make a life with the land, not simply something from which to extract for profit. They view the land as a part of their family, their stewardship of wildlife as their heritage and legacy, and will protect species and habitats fiercely.”

Capturing the animal world is one of the most challenging photographic pursuits to undertake. Patience, knowledge of your subject’s behaviors and the ability to react quickly are prerequisites, and technical comfort with your equipment is essential. **Tin Man Lee** remembers his frustration the first time he worked with a super-telephoto lens and admits to being overwhelmed by the lens’ size. Now an award-winning wildlife photographer, Lee provides his insights for working with big glass to help you succeed, too, in his article “Intro To DSLR Telephotos.”

Camera traps are another way to explore the lives of wild animals, which researcher and photographer **Jonny Armstrong** uses in his work in the Pacific Northwest. One might assume that using such a system removes the photographer from the creative process, but Armstrong counters this notion: “Though I’m not there to press the shutter button, camera trapping provides me with much greater creative control than I ever had with telephoto techniques. I now can carefully compose a scene and even control how light spills through the environment and onto my subject.” If you’d like to try using camera traps, Armstrong provides an overview of the equipment and techniques to get you started in his article “Camera Traps For Wildlife.”

Also in this issue are equipment guides to select cameras, lenses and accessories that will help you master the challenges of wildlife photography, whether you’re planning a summer photo safari or documenting the wildlife in your own backyard. Success may not come easily, at first, but it will come. “If I could give only one piece of advice to aspiring wildlife photographers,” Melissa Groo confides, “it would be to stay with your subject... I can’t tell you how many times I’ve woken long before sunrise to travel to my spot only to return with no pictures, but if you keep trying, your hard work pays off.”

—Wes Pitts, Editor



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Melissa Groo

An Improbability Of Puffins | Photo by Melissa Groo

Atlantic puffins at dawn along the granite boulders that ring Eastern Egg Rock Island off the coast of Maine. These boulders provide critical nesting habitat for these puffins. In fact, this tiny island is home to the world's first restored seabird colony. Methods used here to encourage and support nesting have been replicated all over the world to help endangered and threatened seabirds. I photographed these puffins from a blind so as not to disturb them.

Canon EOS-1D X, Canon EF 500mm f/4L IS USM

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Jason Bradley

King Of The Hunt | Photo by Jason Bradley

Behind the camouflage of the tall grass, Murani the lion ("muran" means warrior in Maa, the language of the Maasai) looks upon the plains of the Maasai Mara after sundown. Lions are masters of stealth hunting and mostly search for prey at night. Producing the "red-eye" effect can sometimes be a good thing. The catchlight in Murani's eyes was made with my camera's pop-up flash turned all the way down to avoid adding any light to the scene. The only goal of using the flash was to add the glow to his eyes.

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NEW CANON DSLRS

Full-frame DSLRs may be the format of choice for some, but let's not forget about the extra tele-power of APS-C-size sensors. With the recent release of the **Canon EOS-1D X Mark II**—the update to the aging EOS-1D X—and the **EOS 80D**, there are new options regardless of your preference. Both cameras offer a long list of updates, including newly developed sensors, improved processing speed, speedier continuous capture, Dual Pixel AF (among other AF improvements), expanded ISO sensitivity and enhanced video capabilities—and those are just the highlights.

As always, outdoor photographers will appreciate the 1D X Mark II's weather-resistant seals and rugged build, but other than dual CF and CFast card slots, an improved grip and a touch-screen LCD (for focusing rather than accessing menus), most of the 1D X Mark II's improvements are under the hood. Built around a new 20.2-megapixel, full-frame Canon CMOS sensor, the 1D X Mark II is the first EOS camera with dual DIGIC VI processors and is the fastest EOS camera, to date. When using a CFast card, the camera can reach speeds of up to 16 fps in Live View and up to 14 fps using the viewfinder with AE and predictive AF. Better yet, the 1D X Mark II can capture up to 170 consecutive RAW images at 14 fps and unlimited JPEGs (up to the capacity of the CFast card).

Although, like its predecessor, the 1D X Mark II utilizes 61 AF points, several improvements should prove invaluable to photographers who need quick, responsive AF, even in low light. AF sensitivity at the center point offers better low-light sensitivity at -3 EV (versus the 1D X's -2 EV), AF point coverage across the frame has been expanded, and all AF points are selectable and are supported to a maximum aperture of $f/8$. Low-light capabilities have been enhanced, as



well. The native ISO of 100-51,200 can be expanded to ISO 50 and up to a remarkable 409,600.

The 1D X Mark II now can shoot 4K at up to 60p using the CFast card slot. With the new Frame Grab feature, you can pull an 8.8-megapixel still JPEG from the 4K footage. Canon also has added 120p full HD recording for slow motion. The touch-screen LCD can be used to select the AF point prior to and during recording. And, notably, the 1D X Mark II utilizes Canon's excellent Dual Pixel CMOS AF for fast, accurate and quiet focusing.

For those of you who prefer an APS-C-size sensor, the EOS 80D updates the popular 70D. Built around a newly developed 24-megapixel sensor, Canon has incorporated Dual Pixel CMOS technology and broadened AF coverage across the frame with 45 AF points—a big jump from the 70D's 19 AF points. Better yet, the 80D offers $f/8$ compatibility at 27 different AF points—even for long lenses with tele-extendors. You'll also find large zone AF adjustment, AF point auto switching and a large improvement in metering capabilities, too. The 80D

also borrows the mirror vibration control system from cameras like the 5DS, which helps prevent mirror slap vibration. High-speed continuous shooting is rated at up to 7 fps and ISO can be expanded up to 25,600—even in movie mode.

Videographers will appreciate the addition of a headphone jack for monitoring sound, and Canon promises more accurate AF in movie mode. Pair the new Canon EF-S 18-135mm $f/3.5-5.6$ IS USM kit lens with the companion **Power Zoom Adapter PZ-E1** for super-smooth zooming and adjustable zoom speed. Add the first Canon-branded **DM-E1 external microphone**, and you have a full kit for filmmaking.

The Canon EOS-1D X Mark II is slated to ship in April, with an estimated MSRP of \$5,999. A kit option, with a 64 GB CFast card and reader, will sell for \$6,299. The Canon EOS 80D and kit lens will be available in March for \$1,199 (body only) or \$1,799 (with lens). The Power Zoom Adapter (\$150) and microphone (\$150) are slated to ship in June. **Contact:** Canon, usa.canon.com/eos.

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FUJIFILM X-PRO2

The dust- and splashproof **Fujifilm X-Pro2** has been updated with a new 24.3-megapixel X-Trans CMOS III sensor and a new processor for exceptional performance including quick AF and start-up speed. An innovative Advanced Hybrid Multi Viewfinder lets you quickly switch between optical and electronic viewing. Dual SD/SDHC/SDXC memory card slots, a 3-inch LCD, full HD video, and new monochrome and grain effects are only a few of the features that make this camera worth checking out. List Price: \$1,700. **Contact:** Fujifilm, fujifilmusa.com.



FUJINON XF100-400MM F4.5-5.6 R LM OIS WR

Perfectly matched to the X-Pro2, the **XF100-400mm F4.5-5.6 R LM OIS WR** is sealed against the elements and promises up to five stops of image stabilization for handheld shooting. Twin linear motors enable fast autofocus, and the lens' fluorine coating helps to keep the front lens element free from water and dirt. The lens is compatible with the XF1.4X TC WR teleconverter to extend the focal range to 140-560mm. List Price: \$1,900. **Contact:** Fujifilm, fujifilmusa.com.

PENTAX FULL-FRAME K-1

The new **Pentax K-1**—the company's first full-frame model—follows in the footsteps of its weatherproof predecessors, with 87 seals to protect the camera from the elements. It's well constructed and offers some impressive features.

Built around an AA-filterless, 36.4-megapixel sensor, the K-1 (an AA filter simulator option is available) offers a broad ISO range of 100-204,800, as well as an updated 5-axis shake-reduction mechanism capable of up to 5 steps of image stabilization. Beyond IS, because the sensor can be tilted in all directions, users can fine-tune compositions in-camera. Perhaps even more interesting is the K-1's ability to photograph the night sky. In combination with the camera's built-in GPS, and the movable sensor, the K-1's Astro Tracer is capable of tracking heavenly bodies and keeps stars in sharp focus (versus capturing star trails) for exposures of up to five minutes. Other notable features include a Pixel Shift Resolution option, which captures and combines four images into a single composite. While the composite is still a 36-megapixel image, Pentax promises increased resolving power for high-quality images. In addition to improved AF performance for stills and movies, videographers will appreciate the K-1's microphone input and headphone jack, and while the camera doesn't record in 4K, full HD 1920x1080 motion capture is possible.

Lens compatibility has always been one of Pentax's strong points, and the K-1's multiple image area modes will



accommodate full-frame and APS-C lenses. Pentax has also introduced two new lenses—the **HD Pentax-D FA 15-30mm F2.8ED SDM WR** and **HD Pentax-D FA 28-105mm F3.5-5.6ED DC WR**—bringing the number of lens choices to an even dozen. A **BG-6 battery grip** was introduced, as well.

The nicely priced Pentax K-1 (\$1,799.95), the FA 15-30mm (\$1,449.95) and the FA 28-105mm (\$499.95), and BG-6 battery grip (\$199.99) are slated to ship mid-April. **Contact:** Pentax, us.ricoh-imaging.com.



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NEW SONY a6300 & FLAGSHIP G MASTER LENSES

As the successor to the already-speedy a6000, the new **Sony a6300** offers updates that far exceed its sibling's capabilities. With the ability to lock focus as quickly as 0.05 seconds, the new model offers the fastest AF in its class, and sets the record of any interchangeable-lens camera, with 425 phase-detection AF points for even more accurate autofocus. Continuous shooting up to 11 fps, enhanced AF tracking and 4K video recording are only some of the features that make this an exceedingly attractive upgrade.

High-res sensors benefit from optics with enhanced resolving power. To create the premium **G Master lenses**, Sony employed a unique glass-molding process that results in a smooth transition between sharp and defocused areas to produce more natural, pleasing bokeh. The first lenses in the line are the FE 24-70mm F2.8 GM, FE 85mm F1.4 and FE 70-200mm F2.8, perhaps the three most often used lenses in pro photographers' gear bags.

The a6300 (\$1,000, body only), FE 24-70mm (\$2,200) and FE 85mm (\$1,800) are slated to ship in March. The FE 70-200mm and new 1.4x and 2x teleconverters should ship in May; pricing is to be determined. **Contact:** Sony, store.sony.com.



OLYMPUS M.ZUIKO DIGITAL ED 300MM F4.0 IS PRO

At 2.8 pounds, the latest addition to the **Olympus PRO** line of lenses, the **M.Zuiko Digital ED 300mm F4.0 IS PRO**, is surprisingly lightweight, especially since it delivers an effective 600mm focal range. Equally as impressive is up to six steps of image stabilization when paired with one of the Olympus 5-axis IS cameras (up to 4 steps with other camera bodies using the in-lens stabilization mechanism). Like the OM-D E-M1 and E-M5 II, the lens is sealed against the elements, too, making it the perfect match. List Price: \$2,500. **Contact:** Olympus, getolympus.com.



GOAL ZERO VENTURE 70

Available later this year, **Goal Zero's Venture 70** 19,200 mAh recharger is rubberized, waterproof and designed to withstand rugged handling and whatever challenges your latest adventure presents. The Venture 70 can be charged via USB and is compatible with the company's Nomad 20 solar panel, with pass-through charging so you can simultaneously refresh power on other devices. The unit can charge DSLRs that support USB charging such as the Sony a7R II up to five times, phones up to four to six times or other USB-powered gear. Equipped with two high-speed USB ports, the Venture 70 includes a microUSB cable, and an optional Lightning cable is also available. List Price: \$150.

Contact: Goal Zero, goalzero.com.

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PANASONIC LUMIX G 100-400MM LEICA DG VARIO-ELMAR

With a 35mm-equivalent focal length of 200-800mm, the new **Panasonic LUMIX G 100-400mm Leica DG Vario-Elmar** Micro Four Thirds lens certainly will find its way into the camera bags of outdoor photographers and videographers. Currently, the longest focal length for Micro Four Thirds mounts, the lens features Power OIS and is compatible with dual IS. It's weather sealed, offers silent zooming for video and features a 240 fps AF motor for fast AF. A two-part tripod mount makes it easy to switch between landscape and portrait, as well; the lens also has an integrated, hideaway hood. List Price: \$1,800. **Contact:** Panasonic, shop.panasonic.com.



MINDSHIFT GEAR ULTRALIGHT BACKPACKS

Everything about these new backpacks says lightweight—from the fabric and thinner webbing to the light buckles and less padding on shoulder straps. With enough room to pack cameras, lenses, tablets or laptops and personal gear, the **UltraLights** from **MindShift Gear** come in three sizes: the **Sprint 16L** for mirrorless or compact DSLRs; the **Dual 25L**; and the **Dual 36L** for standard-sized DSLRs, lenses and up to a 15-inch laptop or a hydration reservoir system. All three come with a rain cover, while the latter two models feature a removable camera compartment. List Price: \$120-\$200. **Contact:** MindShift Gear, mindshiftgear.com.

SIHL MASTERCLASS INKJET PAPERS

Sihl, a company with a long history of papermaking and coating, has launched its **Masterclass photo and fine-art inkjet papers** in North America. The eight-product line includes a variety of surfaces, ranging from Metallic Pearl High Gloss and High Gloss Photo to Lustre (also available in double-sided paper), Satin Baryta and several matte options. Papers are available in 25-sheet boxes sized 8½x11 and 13x19 inches, as well as 24- and 44-inch-wide rolls. List Price: \$13 (sample pack); individual paper types start at \$20. **Contact:** Sihl, sihlmasterclass.com.



TOKINA AT-X 14-20MM F2.0 DX

Available in Canon and Nikon mounts for APS-C (DX)-sensor cameras, the **AT-X 14-20mm F2.0 DX** lens is **Tokina's** fastest zoom, to date, with a constant *f*/2.0 aperture throughout its 21-30mm equivalent focal length. A new optical design uses three aspherical lens elements and four SD glass elements, as well as nine diaphragm blades. Tokina's One Touch Focus Clutch mechanism lets users move quickly between AF and manual focus simply by snapping the focus ring forward or back. List Price: \$899. **Contact:** Kenko Tokina USA, kenkotokinausa.com.



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Worth The Effort

The Panoramic Option • Photo Contest Lottery

By George D. Lepp and Kathryn Vincent Lepp



Balloon Classic. Lepp captured this panorama of a scene from the Colorado Springs Balloon Classic using a handheld Canon EOS-1Ds Mark III with a Canon EF 24-105mm f/4L IS USM lens at 50mm. The composited panorama consists of five vertical images captured at f/13 and ISO 400. The panorama was possible due to the slow movement of the balloons and speedy capture of the five overlapping images. A small amount of correction was necessary in Photoshop to match the ripples on the water from image to image.

The Panoramic Option

I don't recall anyone at OP discussing shooting panoramas from a moving platform. What techniques can you pass on that will allow a handheld method for panoramas from both moving and stationary positions?

R. Behrstock
Via email

The potential for capturing a panorama is almost always present; for the most part, we see in panoramic mode. While consistently good results are best achieved from a stationary tripod base, that's not always possible. What if you're not carrying a tripod, or if you're shooting from a moving platform, such as a boat or plane? If the subject is compelling, it's worth giving another method a try.

Photographing a panorama by hand-holding the camera isn't that difficult. First, identify a stationary point of reference, such as the horizon, to line up your captures; if the panorama is vertical, find

something on the left or right to serve as a constant point of reference. Then, it's important to rotate the camera around the center of the lens as you capture the sequence; that is, keep the camera in the same place, as if it were mounted on a tripod, and pivot it to reframe each image in the sequence. In your framing, give yourself some extra room around the main subject, either above or below in a horizontal pano, or to the sides of a vertical, because you'll need to crop the assembled pano to square it up.

Sometimes I use an aerial mapping technique to capture a handheld panorama from a unique perspective. It's the same concept as used by satellites to photograph the earth below. The photographer/camera is moving before the subject at a consistent speed or pace, and the image sequence is captured at regular intervals, with each capture overlapping the previous by about 50%. I've used this technique to capture panoramic landscapes from an airplane, or from a boat moving

parallel to the scene, but you can apply it on the ground, as well. Maintain a consistent distance from the subject as you move along before it, stopping regularly to capture images with 50% overlap. This works best if you can move back from the subject enough that a medium telephoto can be used. The edge distortion of wide-angles makes them hard to stitch.

Let's say you're in the bow of an advancing boat and the scene cries out for a panoramic capture. Lens choice matters. A wide-angle probably won't work very well, as you'll be imaging the moving water directly below your position, and distortion at the edges makes matching and stitching the frames much more difficult. Focal lengths from a normal lens through a medium telephoto will work best in this situation. Overlap the captures by about 50%, and take the series very quickly so that the repositioning of the camera caused by the movement of your platform, the boat, only minutely changes the composition of the panoramic image

in the distance. Eliminate the foreground, because it's changing much more rapidly as you advance. Panoramic sequences captured in this way should merge together without significant difficulty.

Changing from a single-image format to a panorama really is about understanding the principles involved and implementing them, whether from a tripod, handheld or even from a moving platform. The advantages of the panoramic format are higher resolution, more detail and larger prints; while it may not work every time, it's always worth the effort.

Photo Contest Lottery

Is it worth my time and money to enter nature photo contests? Some have excellent prizes associated with them, even money, but what are the odds of winning?

*J. Fitzgerald
Via email*

There are two essential questions to ask before you submit your images to a photography contest: "What's in it for them?" (the contest sponsors), and "What's in it for me?" Consider the following factors:

- Is the sponsor a reputable organization, with a strong record for upholding principles that you share? Would you want your name and images to be associated with that organization's mission?

- Is there an entry fee? Recognize that, with few exceptions, a portion of any entry fee will be diverted to funding the sponsoring organization's activities. Your participation in the contest is part of their fund-raising strategy. This isn't necessarily a bad thing; participating in a photo contest and thereby helping to fund an organization that's consistent with your principles of volunteerism, philanthropy and/or activism can be a very satisfying experience.

- What image rights are you granting? Note carefully the contest terms and conditions. These terms may be in conflict with other usage of the image you've already granted. Some contest sponsors claim ownership of winning images, or even of all submissions. If there's an entry fee coupled with relinquishing the rights to your submission, then you're essentially paying them to use your image, in any way and for as long as they want.

- What's your motivation for entering any particular contest? "For the money" isn't a good answer, as there are few winners. "For the exposure" is a good answer,

(Cont'd on page 75)



GFPphotos Greg Punelli

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*Watson Lake Park, Arizona***LOCATION**

Watson Lake Park is located four miles north of downtown Prescott, Arizona. This iconic reservoir may be one of the most photographed landscapes in all of central Arizona. Originally built for irrigation in the early 1900s, the lake has been owned and operated by the City of Prescott since 1997 to preserve flora, fauna and water, as well as to provide a variety of recreational resources. Hiking trails encompass the lake, and there's no shortage of spectacular vantage points. The infamous Granite Dells seemingly arise from the lake. Other nearby lakes, mountains and the Prescott National Forest provide plenty of photo opportunities.

WEATHER

Springtime in the area often brings abundant wildflowers and dozens of species of migrating birds and waterfowl. At an elevation of just over a mile high (5,400 feet), Prescott boasts some of the mildest weather anywhere. Average temperatures in April range from 37° to 67° F (3 to 20° C). It's not unusual to need a change of clothing, from a warm jacket in the morning to shorts and a T-shirt in the afternoon, so plan to wear layers. An occasional winter snow or late summer monsoon rains aren't uncommon. Warmer Phoenix to the south and cooler Flagstaff to the north are each about an hour's drive to the lake.

PHOTO EXPERIENCE

I shot this image on a cloudless day while attending a photography workshop in January 2015 with people from all around the



western United States. This photo was taken in late afternoon along the Peavine Trail, which borders the east side of the lake. I wanted to capture the different textures of the boulders and mountains, as well as the contrast between warm late-afternoon hues and the cool blues of water and sky. I used a Panasonic Lumix G6 with a Lumix G Vario 14-140mm f/3.5-5.6, and shot wide at 19mm (38mm full-frame equivalent). A sturdy tripod and cable release were essential to getting a sharp image. I often use a circular polar-

izer, which can help to cut the water's reflections and bring out the rich colors of the boulders and vegetation, as well as cut down the bright sunlight. Early mornings and late afternoons are the best times to photograph in the often-harsh Arizona sun.

BEST TIMES

There's no one season more popular than another in the Prescott area—outdoor photography is a year-round venture there. Restaurants, hotels, shopping, antiques and art galleries are just a few of the

other offerings available in this tight-knit community. Lake area activities include boating, fishing, bird watching, rock climbing and camping. As of this writing, the daily entrance fee is \$2 (including parking pass; longer-term parking passes are available). Camping is available for an additional fee. **OP**

Contact: City of Prescott, prescott-az.gov; Arizona Office of Tourism, visitarizona.com/places-to-visit/north-central-arizona/watson-lake. See Karen Martin's work at facebook.com/karenmartinphoto.

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When temperatures can span a wide range in just a few hours, smart layering will keep you comfortable and your gear light. **Patagonia's R1 Pullover** for men and women features Polartec Power Grid fabric that's lightweight and breathable—wear it under a shell for extra warmth or as an outer layer when the weather is mild. Off-shoulder seams reduce chafing from your camera backpack's straps. It also compresses to be highly packable when temperatures rise. List Price: \$129. **Contact:** Patagonia, patagonia.com.

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▲ **Aspen Photo Art by Larry Bennett** Late September, 10,000 feet, in the Colorado high country. The Lost Horse Mill, built in 1892, on the Crystal River in Western Colorado. This panorama is composed from 8 images, shot with a Canon 7D and Canon 70-200mm f2.8 lens.

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Wildlife Biographer

TEXT & PHOTOGRAPHY BY MELISSA GROO



A Spirit Bear (or Kermode bear) cub finishes the remnants of the salmon his mother has just caught for him in a nearby stream, Great Bear Rainforest, British Columbia, Canada.

Telling the stories of the animal kingdom

All my life I've been drawn to animals, particularly wild ones. Though I grew up in the concrete jungle of New York City, in my adult years I've gravitated to wild, natural places and to the large charismatic creatures that live there, from forest elephants in central Africa to humpback whales in the Caribbean. Sometimes my

work has coincided with that affinity for animals, but that's not how it started.

A decade ago, looking for a hobby, I took a course in basic digital photography at a community college. I bought a digital SLR camera with a 100mm f/2.8 macro lens and a good tripod, and I focused on plants. I was fascinated by the camera's ability to capture the most minute detail and the most intense

color. To be able to reveal the hidden world of a wild orchid or pitcher plant excited me. I spent a lot of time exploring bogs and forest floors. Thanks to the instant feedback that digital technology provides, my skills advanced quickly.

A few years later, I discovered the world of bird photography, and I outfitted myself with the best possible camera gear for small, fast-moving subjects—a pro-level Canon camera body, a 500mm telephoto lens, a carbon-fiber tripod and a gimbal head. It didn't take long until I expanded my focus to all wildlife.

My discovery of wildlife photography felt like a fulfillment of that lifelong affinity and fascination for animals. It also felt like a natural progression from the work I had been doing in upstate New York at Cornell University, as a research assistant to an elephant scientist. For two field seasons we lived in the Central African Republic to study elephants in the wild. There, I learned that what we know about wild animals is only the tip of the iceberg, that theirs is a world as complex as our own, though in a myriad of different ways. I also learned that they share much with us—that they feel joy, affection and grief. I've seen elephant family members reunite with great emotion, try to rescue unrelated dying infants, and young and old frolicking joyfully in mud pits. During this time, I also learned that patient, long-term observation can yield treasures, something that serves me well as a wildlife photographer.

Wildlife photography allows me to be out in nature and among wild animals, to have an excuse to watch those animals for long periods of time, and then to press a shutter and visually preserve a fascinating moment in natural history or a moment of great beauty. A fast shutter speed and many frames per second allow me to freeze a bird's extravagant pose with fully fanned tail feathers or perfectly outspread wings, to capture moments that reveal wild animals' relationships with one another, as well as what I see as their individual characters, and to do it in a way that's in line with my aesthetic vision, which is constantly developing. These are the things that drive me in what has become my profession.

I consider myself a wildlife biographer almost as much as a photographer, because I aim to visually tell the stories of wild animals' lives. I'm deeply interested in the natural history of my sub-



A pod of American white pelicans settles into its roosting spot, Bear River Migratory Bird Refuge, Utah.

jects, and I'm always on the alert for interesting behaviors and gestures. To know what's unique, what's truly revealing, I have to know the basics of my subjects' lives—what and when they eat, the risks to their survival, their family structures, how they move through their environment and what motivates these movements. Such knowledge helps me in a number of ways: to know where to look for my subjects, to be near them without disturbing them and to be ready on the shutter when I predict certain behaviors. The photographers I admire most have an innate curiosity about their subjects' behaviors and life cycles, because they intuitively realize that knowledge will help them achieve the most interesting and unique photos. Deeper knowledge of the subject will shine through that work, distinguishing it from the run-of-the-mill nature photos out there.

Knowing your subject's behavior is also critical for us wildlife photographers as we consider how to find and approach them while minimizing our disturbance of them. How can we get close enough to get the intimate shots we want while minimizing the disturbance our presence inevitably causes? I've found blinds and camo of various kinds to be essential tools. My most essential blind is my car (my mobile blind), as birds and other animals seem to have much more tolerance for humans in vehicles than humans on foot. I've even sat in my car in my driveway and photographed birds in my yard that way! Beanbags are a handy tool, but there are also sophisticated window mounts available that can support cameras and telephoto lenses.

I own several inexpensive fabric pop-up blinds often sold as hunting blinds

and a top-of-the-line photography blind, made by Tragopan. Whenever I can, I try to erect my blind at least a few days before I inhabit it so that animals can get used to it as part of the landscape. Spontaneous use also can work well, though—I have one friend who uses a pop-up blind at a New Jersey beach (setting it up outside the roped-off areas) to get incredible shots of nesting beach birds. They forget entirely that he's there.

In addition, when I travel, I often look for blinds in wildlife refuges that have been set aside for photographers. I was able to get some great photographs of sharp-tailed grouse from a blind in northeastern Montana one spring. One trick to keep in mind with blinds is to have someone go in with you and then have that person leave. Apparently, birds are smart enough to notice the



departure, but not necessarily to count how many went in!

Other tools in my arsenal include a Kwik Camo blind, a ghillie suit and, of course, camouflage clothing.

Making wildlife come to us holds a lot of attraction. It's so much easier than sitting and just waiting for something to happen or driving around for hours. Sometimes I photograph the songbirds that perch near my feeder, and I've used bird call playback from time to time on common songbirds. More and more, I've realized that if we're using some kind of lure, it's critical to think about the consequences of our actions. If we're feeding birds to draw them in, are we keeping our feeders clean? Stocking them regularly? Putting them at the prescribed distance from the window? Keeping cats inside? Building consciousness about the safety of our sub-

jects into our regular practice is the best we can do. Mistakes made can inform decisions in the future. What more can we aim for than to always keep the welfare of our subjects foremost in mind?

I think that as time goes on, you try to be more sensitive to when your presence simply isn't going to be acceptable, when it's clear you just have to walk away despite what looks like a great opportunity, especially for sensitive subjects like the young of any species. I remember my excitement a couple of years ago to find a kingfisher nest on a riverbank. Kingfishers are a challenging species for many of us due to their shyness. I came back the next

day with my Kwik Camo blind and set it up quickly on the opposite bank, about 20 yards away. I could hear a kingfisher just out of sight down the stream, chattering at me. Half an hour went by and it still hadn't returned to the nest. Finally, it flew in with a fish, but at the last moment, veered away from the nest and flew out of sight, its eye on me despite my blind. Realizing that my presence might be keeping its brooding mate or its growing nestlings from being fed, I left and never returned. The risk to the kingfisher was greater than the importance of any photo. I believe that weighing these things when we're out in the field is a critical part of our



A burrowing owl parent grooms its chick outside their ground burrow, Cape Coral, Florida.



A red fox father takes a break from grooming his kit to look off toward the setting sun, Lansing, New York.

An African lion cub rests at the head of his sleeping father, the Serengeti, Tanzania.

development as nature photographers.

My biggest thrill comes from photographing a wild animal doing what it would be doing if I wasn't there at all. Thus, I spend a lot of time trying to be unobtrusive, in both my appearance and my approach. Animals have much sharper senses than our own, and in almost all cases they know you're there. The goal is to be so undistruptive, so still and nonthreatening, that they will forget all about, or at least tolerate, your presence. My wish not to disturb or interact with my subjects is partly selfish—my best work has resulted, without exception, from moments when my presence was accepted and natural behavior took place that had nothing to do with me. Sometimes it takes a while until an animal resumes its normal behavior after you first appear, but if you wait long enough, are careful and are situated with a low profile, at a respectable distance or in your blind, the animal will return to its business, in many cases. I tend to set up farther from the subject than I would like and then I creep closer, on belly, knees or feet, depending on the situation.

If I could give only one piece of advice to aspiring wildlife photographers, it would be to stay with your subject. You won't be privy to special



moments by lingering for a few minutes and then moving on to the next bird or moose or bear. You get those moments by sitting and waiting and sometimes being bored out of your mind. Often, nothing ever happens and you leave feeling frustrated and fed up. I can't tell you how many times I've woken long before sunrise to travel to my spot only to return with no pictures, but if you keep trying, your hard work pays off. I encourage people to get what's called a "sit spot," a place in the woods or by

a pond or lake near where they live (choosing a spot near a source of water is a good choice). Settle on a spot under a tree, or erect a blind that can outlast the winter, and get a comfortable seat for it. Visit that spot throughout the seasons. Become a part of that landscape so the wild inhabitants become relatively comfortable with you. All you need is one subject—a woodpecker that frequents a certain tree or a chipmunk stocking its winter store. I have this mantra I repeat to myself, as I live

in upstate New York, where it can be tough to find and get near wildlife: “It only takes one.” It certainly fits with my ideas of staying with your subject.

There are certain qualities I hope to capture in animals: their nobility, their grace, their elegance. I also try to capture certain emotions: their affection for one another, their playfulness, and, at times, what I see as simply their joy in being alive. I also look for “gesture.” You’ll hear wildlife photographers talk about this. What I take that to mean is a movement or pose that’s an indication of a state of mind, a response to something or a precursor to more dramatic behavior. Gesture might be as subtle as the inclination of a head or the lift of a tail, or it may be more obvious like a raised front paw or the revealed white of an eye. I’m interested in capturing gesture because I think it can convey a sense of the inner life and mental workings of the animal.

I’m certainly drawn to capturing moments and creating photographs that evoke an emotion in the viewer. I definitely have an agenda with my photos, there’s no question. I very much want people to realize how extraordinary wildlife is, how the urges and emotions of animals aren’t so very different from our own, and how there’s magic out there all around us, stories waiting to be captured by you and your camera. These stories can help raise awareness and spark appreciation and awe of nature in others who don’t have the privilege of accessing wild places. Photography, more than ever, has the power to affect positive change. It’s exciting to realize that any of us can get involved in that, if we wish.

Understanding the technical aspects of photography is critical, from knowing your camera’s operations inside and out, to understanding composition and exposure. I shoot in Manual mode, because I like to be in complete control of the triumvirate—shutter speed, aperture and ISO. I put shutter speed first in that list, as it’s always what I think about first. Being keenly interested in behavior, I want to make sure I’m ready for fast movement. Nothing is more frustrating than seeing something exciting happen, but ending up with fuzzy shots. I’m also always thinking about light, and I like to experiment increasingly with the angle of the light to my subject. You’ll hear quite often that the sun should be behind you and pointing



At sunset, two snowy egrets fly up in an adversarial stance in a probable dispute over feeding territory, Chincoteague National Wildlife Refuge, Virginia.

at the animal, and in many cases, that’s true, but I’ve also learned that sidelighting and backlighting can really highlight detail, texture or form in ways that front light simply can’t do.

More than anything, I think what motivates me is the idea that anything can happen. Anytime I head out the door with my camera, I know that I might capture something that’s rarely even observed, let alone photographed.

Melissa Groo’s Wildlife Gear

Canon EOS-1D X

Canon EOS 5D Mark II

Canon EOS 7D Mark II

Canon EF 70-200mm f/2.8L IS II USM

Canon EF 400mm f/5.6L USM

Canon EF 600mm f/4L IS II USM

Canon EF 100mm f/2.8L Macro IS USM

Canon EF 24-105mm f/4L IS USM

Gitzo 3530LS carbon-fiber tripod

Wimberley V2 gimbal head

I might see a story unfold that’s just waiting to be told and shared. One thing that’s so wonderful about photographing the natural world is that little stories are happening all the time, all around us. You don’t have to go to exotic locales. At the local urban park, you

might find a mama squirrel moving her young from one tree cavity to another. In your own yard, you might find a yellow-bellied sapsucker dipping insects into sap wells on a tree for its young.

An aspiring wildlife photographer wrote me recently after he had spent some time looking at my work, something that I thought was exceptionally insightful: “I actually get it now. Whether it is me in Connecticut photographing eagles or you in the Serengeti photographing impalas, it is all the same. The only difference is location. It is all about that one moment. That moment when the photographer makes a connection with the subject. The moment you press the shutter button you are one. The moment another sees the photo and also makes a connection. I no longer envy those that get to shoot in other locations. The end result is one and the same. The connection is what I am after and the location is only a place.” Wise words.

Tread lightly, and shoot from the heart. **OP**

Melissa Groo is an award-winning wildlife photographer whose work has appeared in numerous publications including Smithsonian and Audubon. She’s a regular contributor to Outdoor Photographer with her column “Wild By Nature.” See more of Melissa’s work at melissagroo.com.



Wildlife of the

**A lingering wildness
worth protecting
still survives on
America's prairies**

It was just before sundown, and I was laying on my belly in a small homemade blind on a prairie dog town in western South Dakota. I had been sliding into and out of this slim coffin-shaped hide of garden fence and meadow hay from midday until dark for nearly a week, my telephoto lens pre-focused on a spot, resting on an old duct-taped bag of birdseed. Waiting. I

was hoping to capture a moment when a burrowing owl might emerge from its underground nest and into the light of day. Then, suddenly, it happened.

There, in the cool of the evening, it was as if I was watching an actor being lifted up onto the stage. Through the viewfinder I first saw the top of its feathered head, then its eyes, then the rest of its body rose up into the frame.



Great Plains

TEXT & PHOTOGRAPHY BY MICHAEL FORSBERG

Bison in Wonderland

A lone bison bull roams the prairie under a blue dome of sky. Before Euro-American settlement, some 30 million bison thundered across the Great Plains. By the late 1800s, they had been hunted to near-extinction. Wind Cave National Park, South Dakota

Once aboveground, it paused, looked left, then right, then arched its wings and, standing on one leg in a remarkable pose, leaned forward and fixed its intense gaze directly at me.

In an instant, the moment was gone, yet I'll never forget it for the rest of my life. That fierce look from that tiny little owl pierced my soul like nothing else ever has or maybe ever will. It also

proved to me that there was a lingering wildness that still survives on the prairie and that it's worth protecting.

I was born and raised in Nebraska in the heart of the Great Plains, a place where grass rules over trees, where the land seems just an anchor for the sky. To most people, this heartland is simply "flyover country," one big flat cornfield you drive through at 75 miles

per hour or fly over at 30,000 feet.

To be fair, it's hard to appreciate the Great Plains from a roadside pullout in five minutes. It doesn't knock your socks off at a glance like the Rockies or the Grand Canyon. If you linger, though, the more time you spend, the more beauty you see, and it's remarkable—like tens of thousands of migrating sandhill cranes falling like autumn leaves against

a prairie sunset on the Platte River during spring migration, or a thundering herd of bison running as fast as the wind, racing each other across the South Dakota Badlands, kicking up snow on a -10° day, or the colorful surprise of schools of tiny native minnows the size of your pinkie living in clear, groundwater-fed streams in the Flint Hills of Kansas, as colorful as fish on a coral reef.

Less than 200 years ago, this immense region called the Great Plains was one of the greatest grassland ecosystems on earth, a million-square-mile kingdom of grass with 30 million or more bison, millions of elk, pronghorn and deer, billions of prairie dogs, top predators like Plains grizzlies and wolves, and indigenous cultures shaping and re-shaping the land. It was a nexus of life ever in

motion and in sync with the harsh cycle of the seasons. The native wildlife that evolved here had two key survival strategies: the ability to move long distances quickly to find shelter or food; or to go underground, hunker down and wait.

Then, in the blink of an eye, Euro-American settlement moved West, the prairies were plowed up, the rivers dammed and diverted, and the land otherwise tamed, and much of that wildness was gone. Today, the Great Plains is a vitally important working landscape and one of the great breadbaskets of the world, but it's also one of the world's most endangered ecosystems, and its conservation challenges are complex.

Grassland birds are declining at a faster rate than any other group of birds in North America. Prairie dog towns,



Joy

A sandhill crane dances for joy in a wet meadow grassland near the Platte River. With a clarion call and an elaborate courtship dance, cranes are perhaps the oldest surviving bird species on earth and are revered in cultures around the world. Today, 13 of the world's 15 crane species are endangered. The sandhill crane is the most numerous, the whooping crane, the most rare, and they both migrate through North America's Great Plains. Platte River Valley, Nebraska

Balancing Act

A burrowing owl stretches outside its underground nest burrow in the cool of a summer evening above a prairie dog town in Conata Basin, Buffalo Gap National Grassland, South Dakota.



Wildlife of the Great Plains



Cather Country

A monarch butterfly gathers nectar from Indian blanket flowers. Each spring, succeeding generations of short-lived monarchs move up the Great Plains as far north as Canada, following the prairie bloom. In fall, they make an astonishing long-distance migration to the forests of central Mexico. South-central Nebraska

once the center of the wheel of biodiversity in the region, are continually losing ground to an invasive species: plague. Agricultural conversion and booming energy development, with its dense matrix of roads, fences and power lines, destroys or fragments habitats, and compromises or stymies animal movements and migrations, from pronghorns to bats to monarch butterflies.

This is exactly where the power of photography can come into play. I've dedicated most of my career trying to shine a light on this often-overlooked landscape and its creatures. I've tried to use my camera to build appreciation for wildlife and native landscapes that remain, and to take an honest look and see what sort of shape the ecosystem is in.

What I've learned all these years is that photographing here is rarely easy. Most wildlife has evolved on the prairie to run fast, has great eyesight, lives in holes in the ground, and some are hunted. If you can see wildlife off in the distance, it's a good bet they have already seen you. Photographing here takes time, failure rate is high, and the land and its climate don't suffer fools lightly. Blinds can be blown away or flooded out, and sometimes defiled by cattle or bison. It seems to be always too hot or too cold, too wet or too dry, and sometimes all in the same day. You learn that if the wind isn't blowing for very long, get nervous, because that usually means a storm is coming. And, if the rancher says it's "just over

the hill," you'd better pack a lunch.

Most of the land here is in private ownership, but that doesn't necessarily mean it's not managed for conservation. Many ranchers and farmers make a life with the land, not simply something from which to extract for profit. They view the land as a part of their family, their stewardship of wildlife as their heritage and legacy, and will protect species and habitats fiercely.

So many of the important issues of the day regarding the land are playing themselves out in the Great Plains, from food systems to energy development, water quality and water scarcity, soil health and pollination. All the while, the wildlife that lives here is simply trying to thread the needle to survive.

Wildlife of the Great Plains



Nomads of the High Plains

A herd of migrating pronghorn marches through its winter range in the Milk River Breaks. In severe winters, pronghorn survive by staying on the move. Impervious to national boundaries, these animals sometimes travel 500 miles round-trip between their summer range in Canada's Prairie provinces and their winter range in northeastern Montana.



A Hunter's Prize

A swift fox carries the front half of a prairie dog back to its den to feed its pups in the shortgrass prairie. Swift foxes are only the size of small house cats, yet can reach speeds of over 30 mph. Shy, yet highly social, their numbers and range have declined precipitously over the last century, victims of incidental poisoning to control coyote and prairie dog populations, and loss of habitat to agriculture and energy development.

Wildlife photography is a critically important tool to build appreciation for, and remind us of, our rich natural heritage, but just as importantly, we can leverage its power and beauty to take action to protect these creatures that have no voice and for their own sake.

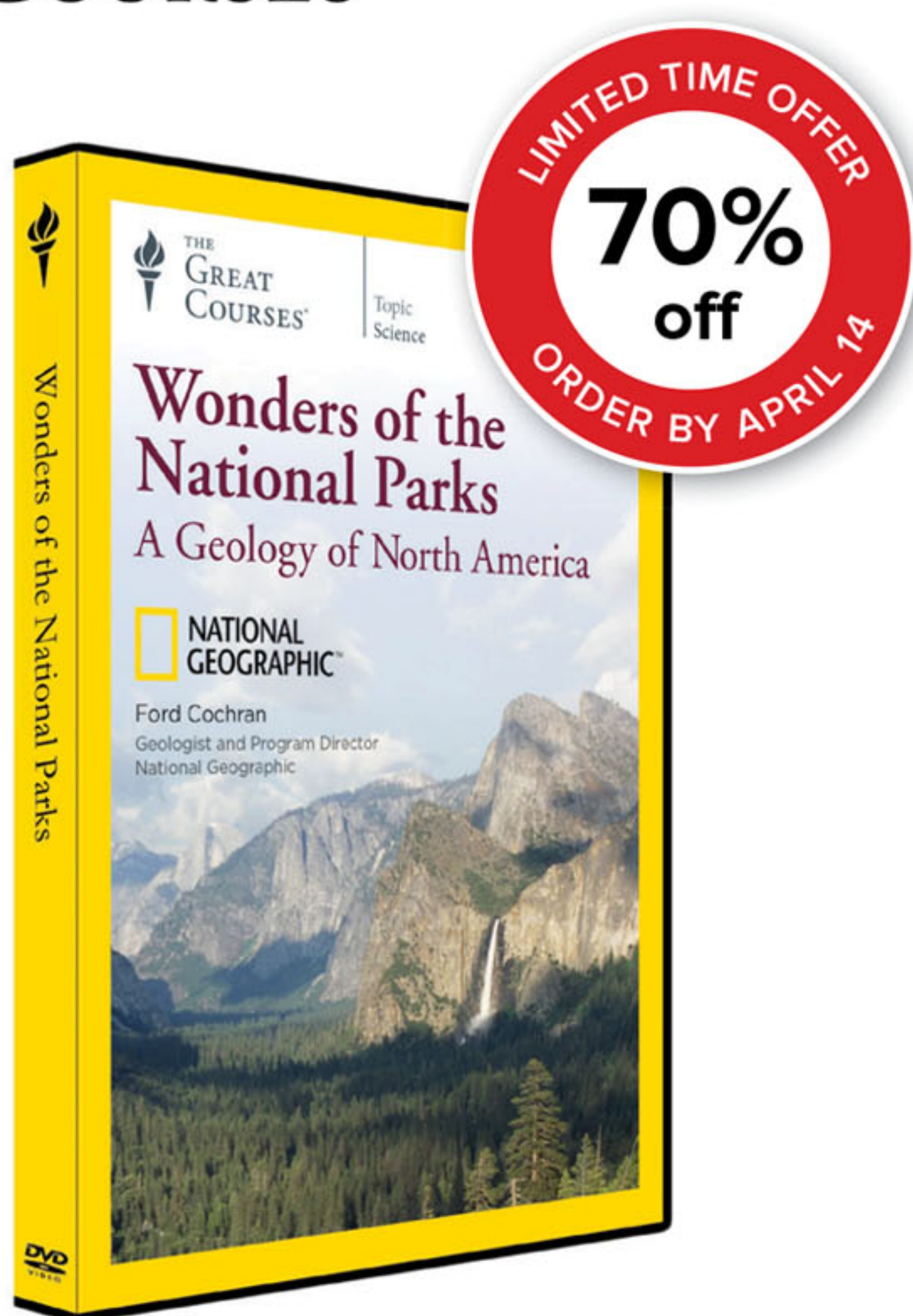
The Great Plains will never be the vast wilderness it once was, but the more

important questions are what do we want its future to be, and will its wildlife and their native habitats that sustain all of us have a place in it?

OP

Michael Forsberg is a conservation photographer, author and speaker. His book "Great Plains: America's Lingering Wild" was published by the

University of Chicago Press and its documentary film under the same title was produced by NET Television for PBS. He currently serves on the faculty of the University of Nebraska, where he's co-founder of the Platte Basin Timelapse Project. See more of his work at michaelforsberg.com and on Instagram @mforsbergphoto.



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25. Carving the Grand Canyon
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31. Montana's Glacier and the Canadian Rockies
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BEHIND THE SHOT



Two Zebras

South Africa

Text & Photography By Laurent Baheux



I am a French self-taught photographer, and first started in journalism in 1994 for a daily local newspaper. At the time, I worked with black-and-white film. Because of that experience, I've always had an interest in, and an affinity for, this technique, with also a great inspiration from masters like Ansel Adams, Peter Beard, Henri Cartier-Bresson and Sebastião Salgado.

Now I photograph only in black-and-white, and my favorite subjects are the animals in the wild and the pristine landscapes. For me, black-and-white is the best way to express the solitary emotion and vitality of wildlife. My aim is to try and forge an intimate bond between the mammals and the human race. I just capture expressions and postures, atmospheres and settings, and let the viewer interpret my work any way they want.

My photographs aren't really informed by a documentary-style vision. They're mostly from the gut and rely on instinct. It's like keeping a record of chance encounters. Sometimes, I'm lucky because all factors for a good picture are combined—composition, light, emotion—and sometimes not. Often, I must be patient and wait.

The zebra is a very photogenic animal, visually and graphically, and takes the light particularly well. It's the best animal to play with contrasts and shapes, especially in black-and-white. This image, taken in South Africa in 2004, perfectly illustrates what I look for in wildlife photography. At first, there's a simple scene, almost banal: Two zebras are side by side and look at me. But, if I move a little, it's a strange being with two bodies and one head. People

may believe that it's a photomontage, but it's only a visual effect. I like to surprise, to interest, to make people smile and to reflect. For me, the worst is an image that leaves the viewer indifferent.

For many years now, my work has been used in awareness campaigns for conservation and environmental organizations including the World Wildlife Fund, GoodPlanet Foundation, Cheetah For Ever Project and United Nations Environment Programme (UNEP). I'm also a UNEP Goodwill Ambassador for the anti-poaching initiative. It seems that the communication of these associations evolves toward a certain aesthetic and artistic vision. People are fed up with shocking images of destruction, poaching and deforestation—even though those images are important to share because we all must know what's happening on our planet. Maybe my pictures can create a connection between animal and viewer because viewers discover a personality in the animals, and realize they have emotions, too. That's the aim of my ninth book, *The Family Album of Wild Africa*, coedited by teNeues and YellowKorner. It's a compilation of 300 duotone images that celebrates the soul and the individuality of animals. My photo of the strange zebra is, of course, part of this big collection. **OP**

See more of **Laurent Baheux's** work and find links to his social media at laurentbaheux.com. His book, *The Family Album of Wild Africa*, is available at www.teneues.com/shop-int/books/new-books-fall-winter-2015/africalb.html.



Intro To DSLR Telephotos

TEXT & PHOTOGRAPHY BY TIN MAN LEE

Insights into long-lens technique for wildlife photography

I still remember the first time I tried a 500mm *f*/4 super-telephoto lens a few years back, and it wasn't pretty. Having rented the lens for the weekend, I was overwhelmed by its size, and I was a bit self-conscious to bring it out to a local park in Los Angeles near where I lived. As I was carrying the lens and walking from the parking lot to the river where there was an egret rookery, I felt as if everybody there was looking at me. It took me half an hour to figure out how to fit the heavy lens onto the tripod, and by then I was soaked in sweat.

I saw a great egret preening in the rookery about 50 feet away, so I pointed the camera toward it. I couldn't locate the egret at all by moving the lens. All I saw was patches of green. Then the egret took flight, and, of course, I was far from being able to focus on the bird.

Within a few years, however, I was able to create lots and lots of images that I love using 500mm *f*/4 and 600mm *f*/4 lenses. I was fortunate to become the grand prize recipient of the Nature's Best Photography photo contest, with photos displayed at the Smithsonian's National Museum of Natural History in Washington, D.C., and most recently held my first invited solo exhibit.

So what happened in these few years? How did I change from someone who

couldn't aim from the viewfinder to winning awards using a super-telephoto lens? The first thing to learn about is the lenses themselves.

Price

I have to admit that it took me years to bite the bullet and invest in a 500mm *f*/4 lens because of its price. Instead, I rented it from lensrentals.com and borrowlenses.com several times to make sure the focal length of the lens was right for what I needed. (Both companies are reliable.) The rental fee is quite expensive, but at least it's not as expensive as buying the lens. I recommend that you try before you buy—but beware—the cost of multiple rentals does add up. One good thing about

A wild barn owl, not called or baited, in central California.

Canon EOS-1D X, Canon EF 600mm *f*/4L IS II USM, *f*/8, 1/1600 sec., ISO 2500, Canon Extender EF 2X III teleconverter, Really Right Stuff TVC-33 tripod, Wimberley WH-200 II head



investing in a super-telephoto lens is that it retains value well. I purchased my first 500mm *f*/4 lens for \$5,800 and sold it three years later for \$5,500.

Weight

The second thing that turns most people off is the weight of these lenses. Indeed, it's true that not many people can handhold a super-telephoto lens for an extended period of time. A sturdy tripod and head are essential. I like to use the Gitzo 3542XLS or Really Right Stuff TVC-33 carbon-fiber tripod with the Wimberley WH-200 Head Version II for support. The fluid motion of the Wimberley head enables movement of the lens without the need to carry it. This setup is good for slow-moving wildlife or birds on a perch. When one needs to move around a lot, a monopod such as an Induro monopod paired with the Really Right Stuff MH-01 Pro monopod head (designed for heavy telephotos) is a good combo.

When the wildlife action requires a bigger range of lens movement, handholding the lens is necessary. The key to handholding a heavy telephoto lens is to observe and anticipate the flight path of a bird or the moving path of an animal, and lift up the lens only when the moment is right. If you can minimize the time between holding up the lens and when autofocus

is acquired, you won't need to handhold it for an extended period of time. You can rest your lens on your shoulder or even put it on the ground to save your energy. Once action happens, all you need to do is swing the camera with the lens up to your eye, focus and click the shutter. Once the action finishes, you can put the camera down. On a related note, I always use a Don Zeck lens cap to protect the front element of the lens when not in use. I also replace the standard lens foot with an aluminum foot to reduce weight.

Size

With the huge size of a telephoto lens, it's easier to get scratched when you carry it out in the field. (I always cover it with a LensCoat to protect it.) I "upgraded"

from a 500mm *f*/4 lens that I used for four years to a 600mm *f*/4, thinking that the extra 100mm would give me an edge. It turned out that I couldn't even fit the lens with a 1.4x teleconverter mounted to my camera on the passenger seat of my car.

One time while I was driving on a backroad, I saw a bobcat. When I tried to point my newly acquired 600mm lens toward the bobcat, I could barely stick the front element of the lens out the window due to its much bigger diameter. Maneuvering the lens to follow the bobcat was also more difficult.

Telephoto Wildlife Tip

I don't wear camouflage clothing. I just approach wildlife slowly and observe their behavior closely. If I sense they're not comfortable, I back down.

A part of the background turned a "salmon" color at the last rays of sunset in the Alaskan Arctic. A 600mm telephoto lens and a 1.4x teleconverter made use of that background. The polar bear cub suddenly woke up, sat against its mom and made this expression, while its mom and sibling were in deep sleep.

Canon EOS-1D X, Canon EF 600mm *f*/4L IS II USM, *f*/5.6, 1/800 sec., ISO 1600, Canon Extender EF 1.4X III teleconverter, handheld from a small boat





The endangered San Joaquin kit fox, which once thrived in the San Joaquin Valley of central California, has had to adapt to live secretly amid development and rarely comes out in daytime. With lots of urban structures in the background, I crouched and stood, moved left and right, to find only this remaining part of the background that didn't include man-made distractions, when the backlit kit fox mom and pup had this interaction.

Canon EOS-1D X, Canon EF 600mm f/4L IS II USM, f/5, 1/1600 sec., ISO 1600, Canon Extender EF 1.4X III teleconverter, Induro monopod, Really Right Stuff MH-01 Pro monopod head

I ended up missing more shots with the 600mm than I did with the 500mm lens, so this is something to consider.

The huge size of these super-telephoto lenses also creates a challenge for commercial air travel. I always put the lens in my Gura Gear Bataflae 32L camera backpack. For some reason, airline personnel tend to ask you to gate-check your bag if it has wheels, so I avoid roller bags for carry-on. I sometimes pack a Kinesis Long Lens Case (L522 or L622) in my check-in bags. These fit my camera, teleconverter and 600mm f/4 all attached, with just the lens hood inverted, so I can quickly take it out without assembling the pieces.

Narrow Field of View

Finding a subject through a super-telephoto lens is like looking through a straw. One needs a lot of practice to quickly find and lock the subject in the viewfinder. For a fast-moving subject, it's much more difficult. I suggest going to a local park where there are waterfowl to practice tracking them with the lens.



A brown bear pouncing for salmon in Katmai, Alaska. Never attempt to get close to animals that are apex predators, such as this brown bear; use a super-telephoto lens to photograph them from a safe distance.

Canon EOS-1D Mark IV, Canon EF 500mm f/4L IS USM, f/5, 1/1600 sec., ISO 800, Really Right Stuff TVC-33 tripod, Wimberley WH-200 II head



Creative Technique: Isolation & Interaction

Isolation. The narrow field of view of super-telephoto lenses allows us to isolate wildlife and creates soft, surreal backgrounds. Sometimes, less is more in wildlife photography. The ability to remove distraction is a strength of telephoto lenses. When using a super-telephoto, we always should have our eyes open to the way these lenses “see,” meaning we should remain aware of the small portion of background behind the wildlife and understand how the background that’s captured will get compressed, magnified and blurred because of the telephoto effect to create something surreal. Always move around to look for that background. Just a step to your left or right, or crouching down, will create a completely different—and better—background.

Interaction. The way super-telephoto lenses isolate the subject from the background allows us to show split-second actions and the intimate interactions with up-close details that aren’t easy to see with the naked eye. Those split-second actions require quickness to focus on the wild animal. In my experience, many of the interesting moments happen within a few seconds from when we see the animals or when we least expect it. The ability not to miss the moment requires us to minimize the time from when we acquire focus to the moment the action happens. Handholding the lens, or using a monopod instead of tripod, sometimes helps.

Subjects of different sizes can create tension and unexpectedness, as when this American bison was grazing closer and closer toward a brown-headed cowbird at Yellowstone National Park, Wyoming.

Canon EOS-1D Mark IV, Canon EF 500mm f/4L IS USM, f/6.3, 1/1250 sec., ISO 800, handheld

Teleconverters

I almost always have my 1.4x teleconverter on my 600mm f/4 lens, as I don’t see any degradation of image quality. For a 2x teleconverter, traditional belief is that it degrades image quality significantly, but in recent years, I’ve seen in several online forums where professional photographers and enthusiasts posted their reviews of the performance of 2x teleconverters. The results blew me away, especially for Canon teleconverters.

Essentially, to the naked eye, the image quality was excellent when a 2x teleconverter was attached to a prime super-tele. The secret is to “stop down” the aperture. For example, with a 500mm f/4 lens, when attached to a 2x, it becomes 1000mm f/8. If one shoots wide open at f/8, the quality degrades a bit, but once you set the aperture at f/11 or smaller, the image quality is spectacular. This opens up a whole new world, as most wild animals are elusive and like to stay far away from us. In order to capture interaction, a super-close-up perspective always helps tremendously.

Shutter Speed and Image Stabilization

We’ve been taught that, in order to get a sharp photo, the rule of thumb is to have a shutter speed of 1/focal length of the lens. So, for a 600mm lens, one should have a shutter speed of at least 1/600. However, as long as the subject isn’t moving quickly, one can obtain a sharp picture with a lower shutter speed.

The traditional way is to put the camera on a tripod and use a shutter release, but as I mentioned, a tripod slows you down, and often it’s not suitable depending on the terrain, such as on a boat or in tall grass and twigs. We can, instead, use two advantages that technology provides: high frame rates and image stabilization. Nowadays, many lenses offer four stops of stabilization. I’ve produced sharp images with a shutter speed of 1/30 handheld.

Technology has helped advance super-telephoto photography significantly. The weight of many long lenses is more manageable and image stabi-

lization has greatly improved to allow a much slower shutter speed to create sharp images handheld. Also, the high ISO performance of many cameras opens up a whole new world for wildlife photography, as most wildlife and birds are active in early morning and late evening when light is insufficient for lower ISOs. By pushing the limit of the telephoto lens and your camera, you can create artistic images with perspectives unseen by the naked eye!

OP



Tin Man Lee has had a deep love for wildlife since childhood. His dream is to capture emotion through wildlife photography and to awaken empathy among us. See more of his photography at tinmanlee.com.



To increase your creative options for photographing wildlife, take yourself out of the equation

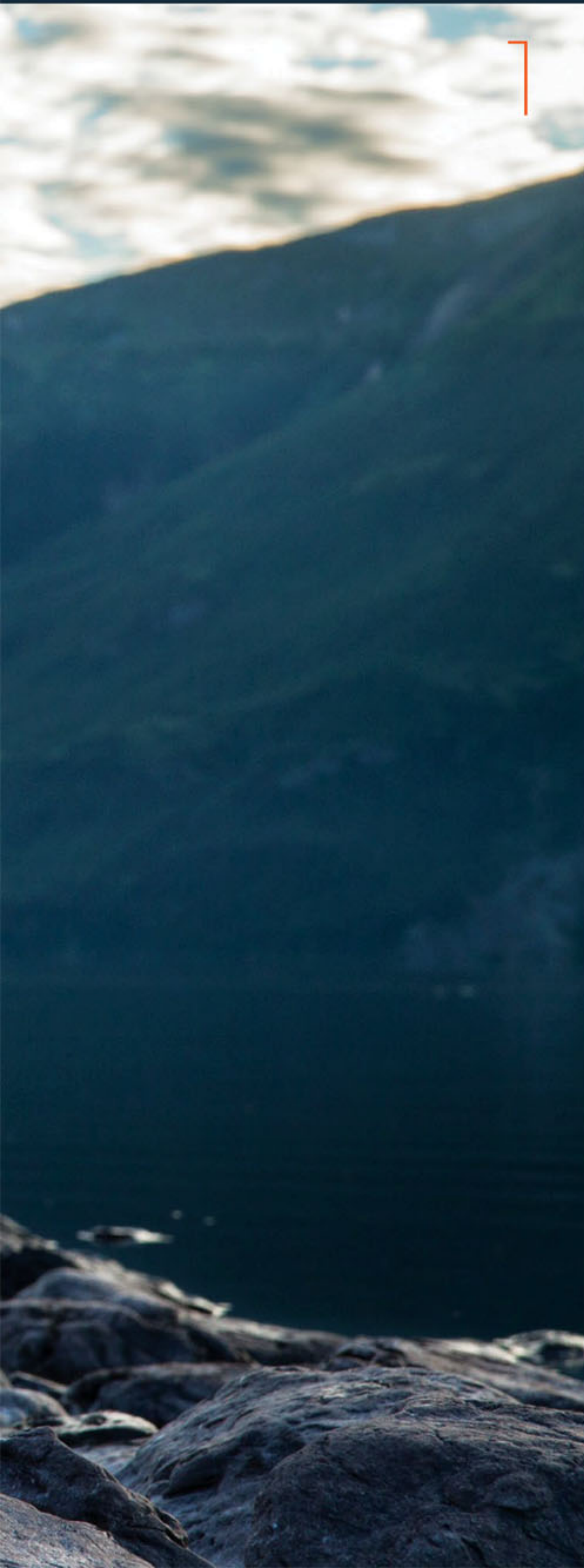
Camera Traps For Wildlife

TEXT & PHOTOGRAPHY BY JONNY ARMSTRONG



1 For several summers, a pair of foxes denned near our field camp. Unlike the skittish foxes I've encountered in the Lower 48, these animals were bold and easy to camera trap. I used a longer focal length than normal, 55mm on a crop sensor, to frame the fox against a mountain backdrop as it roamed the shores of Lake Nerka, Alaska.

2 My friend Jason Ching (far right) and I built our first camera traps from scratch; we went through a lot of trial and error to get our systems working and to find animals. This image shows the results from one of our first sets in the Washington Cascades. Composited together are our test shot, a coyote, a deer mouse and a spotted skunk. Neither of us has captured an image of a coyote since, except on the trail cameras we use for scouting.



Wildlife photography is defined by a single overarching challenge: getting close to critters. The elusive nature of our subjects is what makes wildlife photography unique and exciting, but also immensely frustrating. The solution to capturing our skittish subjects traditionally has been the use of telephoto lenses, which allow us to photograph animals from a distance. While this technique is practical and clearly yields beautiful results, it also can limit creative options in terms of the species that we can photograph and the ways that we can portray them. Traditional techniques require finding animals during the daytime and prevent us from using the focal lengths and lighting techniques available to other types of photography.

If you want to take shots that don't have the compressed perspective of a spotting scope, or if you want to photograph nocturnal carnivores, traditional techniques simply aren't effective. In these instances, remotely triggered cameras provide a powerful tool for capturing unique images of rarely seen wildlife.

In my photography, I use motion-activated "camera traps" to capture lit portraits of carnivores and other wildlife. Though I'm not there to press the shutter button, camera trapping provides me with much greater creative control than I ever had with telephoto techniques. I now can carefully compose a scene and even control how light spills through the environment and onto my subject. I

work like a studio portrait photographer, yet my subjects are elusive wildlife that I may never actually see with my own eyes. For example, I've never encountered a mountain lion, but I've photographed many of them and spent lots of time thinking about how I want my rim lights to reflect off their shoulders.

Camera trapping requires specialized gear that can be tricky to figure out. The good news, however, is that it won't cost you nearly as much as a 600mm lens or a safari. If you want to give it a try, you'll need the following gear.

Camera and Lens

Forget about fancy autofocus and frames per second; your camera only needs two features: a wired shutter release and a sleep (i.e., standby) mode. The shutter release allows you to hook up the camera to a motion sensor, and the sleep mode prevents the camera from burning up its battery while you're waiting for a critter to show up. For some reason, mirrorless cameras often fall short for one of these criteria and don't work for camera trapping even though their small size would be a real asset.

For lenses, I prefer an ultrawide-to-normal zoom, such as a 10-20mm for a crop-sensor camera or a 17-40mm on full frame. This range of focal lengths gives me extra depth of field that helps keep the subject in focus and provides a range of useful perspectives for environmental portraiture. Since you'll be shooting stopped down, even cheap kit lenses will perform just fine. The only



3 *A young grizzly bear triggers a camera set on a streamside game trail. While I was doing my PhD research in Alaska, I'd be out in the field collecting data all day, but there was enough light that I could go out after dinner and set camera traps until midnight on the streams near our camp.*

4 *I set this camera on a game trail frequented by mountain lions. A trail camera set in the area revealed multiple cougars had traveled through the area, but none came close enough to trigger my camera. Instead, my camera captured a long-eared owl, framed against the lights of sprawling suburbs and airliners headed to Denver International Airport.*

5 *A Pacific fisher crosses a stream using a natural bridge, an old-growth ponderosa pine log. Fishers are members of the weasel family, somewhere in between a marten and a wolverine. Due to habitat loss and rodenticide poisoning, fishers are candidates for listing by the Endangered Species Act.*

lenses I specifically avoid are those in the Canon STM line because they have issues with taking pictures immediately after the camera wakes from standby.

Motion Sensor

There are many sensors out there, but in terms of commercially available options for camera trapping, you're limited to active infrared (AIR) or passive infrared (PIR). AIR sensors create a narrow beam between two units (similar to a garage door sensor) and trigger



the camera when something intercepts the beam. In contrast, PIR sensors are one-piece units that detect changes in heat across a broad area. The advantage of AIR sensors is that they can more finely control where an animal will trigger the camera, giving you more control over composition. The advantage of PIR sensors is that they're easier to set up, don't require the animal to be in a specific spot and generally are less expensive. I'd recommend PIR sensors for people new to camera trapping.

Housing

Leaving a camera outside may expose it to precipitation, insects, frisky critters and theft. The protection needed

for a specific camera trap set varies. At a minimum, you'll probably want a rain cover. For full protection, a sealed hard-bodied housing is needed. I build my own from Pelican cases and assorted plumbing supplies. If you don't want to build your own housing, Camtraps offers a simple, portable shelter, and TRLcam provides custom-made fully protected housings. Many camera trappers lock their cameras to trees or other structures, but I just set up in remote areas and cross my fingers. I've yet to have a camera stolen.

Flashes

Many animals are active at night or during twilight, so you may need to use



artificial light. Most camera trappers use Nikon flashes because of their excellent standby function, which enables them to run for weeks on their internal batteries. If you want to use other brands, it's best to run them off of external 6V batteries. If you're shooting during twilight or daytime, a single flash mixing with ambient light works great. However, at night, you'll probably want at least two flashes: a key light that illuminates and shapes the animal, and a fill light that adds detail to the shadows cast by the key light. Lighting night scenes is the most difficult element of camera trapping.

Grip Gear

Before I was a camera trapper, I lusted over big white lenses I couldn't afford. Now I lust over grip gear, which is fortunately much less expensive. A big challenge of camera trapping is getting your camera, flashes and sensor to hold securely in place on rugged terrain. You sometimes can get away with a tripod and light stands, but often you'll need to attach gear to trees, rocks and other structures. I use a variety of gear, including clamps, magic arms, flexible tripods and tie-down straps.

Technique

So you have your gear and you're ready to go. Now what? Time to think like a fur trapper. Go out in the woods and try to figure out how your local species travel across the landscape. Walk

game trails and look for signs, such as tracks and scat. Then think like a landscape photographer and try to find a scene that would make for a compelling photograph. Lastly, confirm that people are unlikely to find your camera.

Once you've found your spot, camouflage your gear with natural items like sticks and brush, but try not to leave too much of your scent around—don't drop your sweaty jacket on the ground, if you can avoid it. You can try using fur trapper techniques such as visual and scent lures, but nothing works as well as finding a natural travel route and waiting.

How long to wait depends on the area, but I generally leave my sets for 10 to 30 days at a time. Frequent checks are good when weather and frisky critters threaten your gear, but the more

you visit your set, the less likely wary critters are to give it a visit.

In terms of camera settings, I use manual focus and try to anticipate how far the animal will be from the camera. For example, I may set parallel to a game trail and focus on the near edge of the trail. I generally set the exposure mode to manual, stopping down to *f*/8 or more for depth of field and selecting a shutter speed that's slow enough to sync with flash and provide the amount of ambient light I want. I may use ISO 3200 if I need lots of power out of my flashes or ISO 200 if I anticipate a daytime shot and need to worry about over-exposing ambient light.

Your first camera trap sets may be disasters—mine sure were. It takes a while to get the gear working right and get the hang of lighting, but if you persevere, the occasional successes make the frequent failures well worth it. Camera traps provide an incredible tool for exploring your local outdoors and discovering photographic opportunities you never knew existed. If you want to take close-up photos of exotic carnivores, you don't need thousands of dollars for big lenses or trips to Africa; all you need is a camera trap and some new skills. **OR**

Jonny Armstrong spent the last decade researching the ecology of coastal Alaska watersheds, using photography not only as a creative outlet, but as a way to communicate science and engage public audiences. He recently started as a professor at Oregon State University, and his future camera trapping largely will focus on rare carnivores of the Pacific Northwest. See more of his work at jonnyarmstrong.com.

Jonny Armstrong's Camera Trap Gear

Because the odds of success can be quite slim, I often deploy multiple camera trap rigs at a time. I use a hodgepodge of cameras and lenses, on both Canon and Nikon platforms.

Cameras: Canon EOS 6D, Canon EOS Rebel T3i, Nikon D610

Lenses: Canon EF 17-40mm *f*/4L USM, Canon EF-S 10-22mm *f*/3.5-4.5 USM (destroyed by an elephant in Kenya), Canon EF-S 17-55mm *f*/2.8 IS USM (destroyed by cows in Kenya), Tokina AT-X 10-17mm *f*/3.5-4.5 AF DX Fisheye, Nikon AF-S NIKKOR 18-35mm *f*/3.5-4.5G ED

Housing: Pelican 1150 Case and

custom lens port by TRLCam

Flash: Various Nikon Speedlights

Flash Trigger: Camtraptions wireless radio trigger or homemade wired sync with Ethernet cables and Pixel RJ45 adapters

Flash Grip: Camo-painted Avenger C-Stand, JOBY GorillaPod SLR-Zoom, A-clamps with mini-ballheads bolted to them, LumoPro compact lightstand, cam straps and lots of camo gaffer's tape

To Mount A Camera To A Tree:

Manfrotto 244 Magic Arm, MeFOTO ballhead, Avenger F301 baby female wall plate, cam straps

Modern Printmaking

Part Three: Workflow

Soft proofing and configuring your print settings for optimal output

TEXT & PHOTOGRAPHY BY JASON BRADLEY



An image from Indonesia's Komodo National Park that's on deck for printing in Lightroom's Print Module.

In the last installment of this four-part series, I talked about creating consistency through calibrating our devices and introduced you to concepts on how to practice ICC color management. The goal was to provide a foundation for printing with a sense of control, by incorporating ICC profiles into your workflow. In this article, I'll focus more on the how-to of

it by covering the important steps and objectives of a typical printing workflow, the keyword here being important.

A typical printing workflow is less about the printer and software you choose or whether you use the manufacturer's print driver versus a third-party RIP (Raster Image Processor; see the sidebar for more on this topic). Instead, the steps I'm referring to are

more universal, and they should be noted regardless of the aforementioned. Most importantly, both the location of, and the configuration of, the settings as you print will vary depending on the platform, the printer and the software used. So, here, I'll concentrate on the issues that I deem to be "important stuff" and that remain the same from one printing workflow to another.

Step 1: Soft Proofing

After a file has been developed and is ready to print, don't hit the print button—yet. I suggest that you soft-proof first. A hard proof is a print we can hold and look at to see if what we've made works, while soft proofs are something we can look at before hitting "Print". Specifically, a soft proof can tell us whether we have color out of gamut and, thus, offers the opportunity to make any adjustments before printing.

When referring to out-of-gamut colors, I'm referring to colors in your file that your printer can't reproduce (Figure 1). In my last article, I talked about how devices in our workflow chain reproduce color differently. Even though your display can show you a particular shade of blue, that doesn't mean your printer can make that same blue. Soft proofing allows us to ascertain if such a discrepancy exists between file and print. It tells us what colors are "out of gamut," and it shows where in our images the out-of-gamut colors are, providing us with the road map we need to correct the problem. Here's how it works when working in Lightroom.

1. While in the Develop Module in Lightroom, look for and check the Soft Proofing box in the toolbar (Figure 2).
2. Look for the Soft Proofing Panel in the upper right of your user interface. Then select the correct printer profile and photo paper you're using (Figure 3). If you're looking for your printer profile for the first time, click on Other and find your profile from a selection larger than the one sampled in Figure 3.
3. Choose a Perceptual or Relative Intent, located below where you chose your profile. Without getting too technical, rendering intents are different methods for moving color from the computer to the printer. For the most part, Perceptual is where you'll want to be, but you can switch back and forth to see which looks better. Ideally, you'll see no change at all.
4. Click on the small Show Destination Gamut Warning icon. Colors that are out of gamut will then show as red (Figure 4).

TIP: Check out the previous article in this series to read more about printer profiles and how to load them.

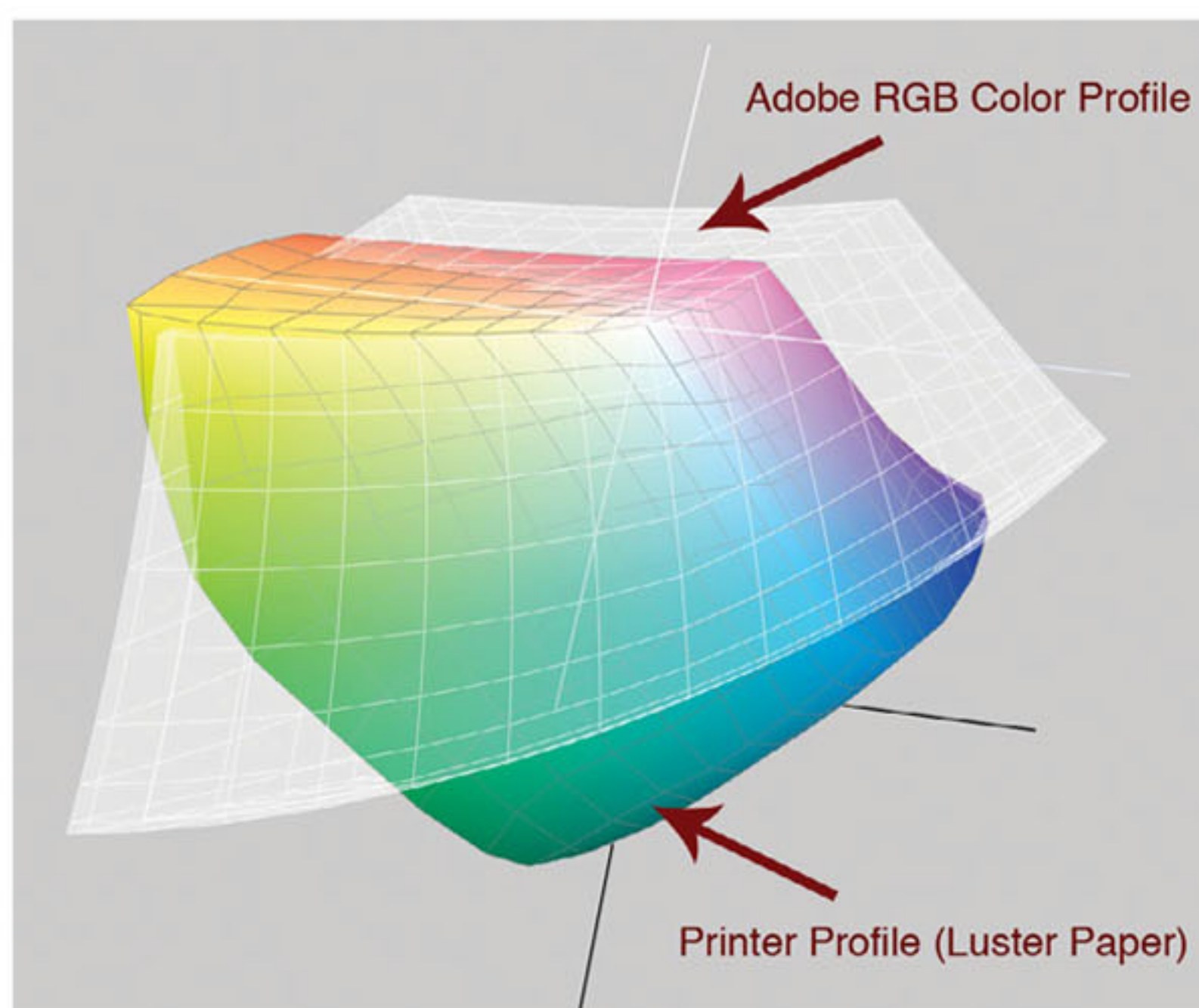


FIGURE 1: Here's a screenshot of a printer profile set inside of a display or monitor profile. As you can see, they're different. Color from your file to your monitor to your print is different and can't always be reproduced when converting to a printer profile.



FIGURE 2: Check the Soft Proofing box to inspect your image file for out-of-gamut color.

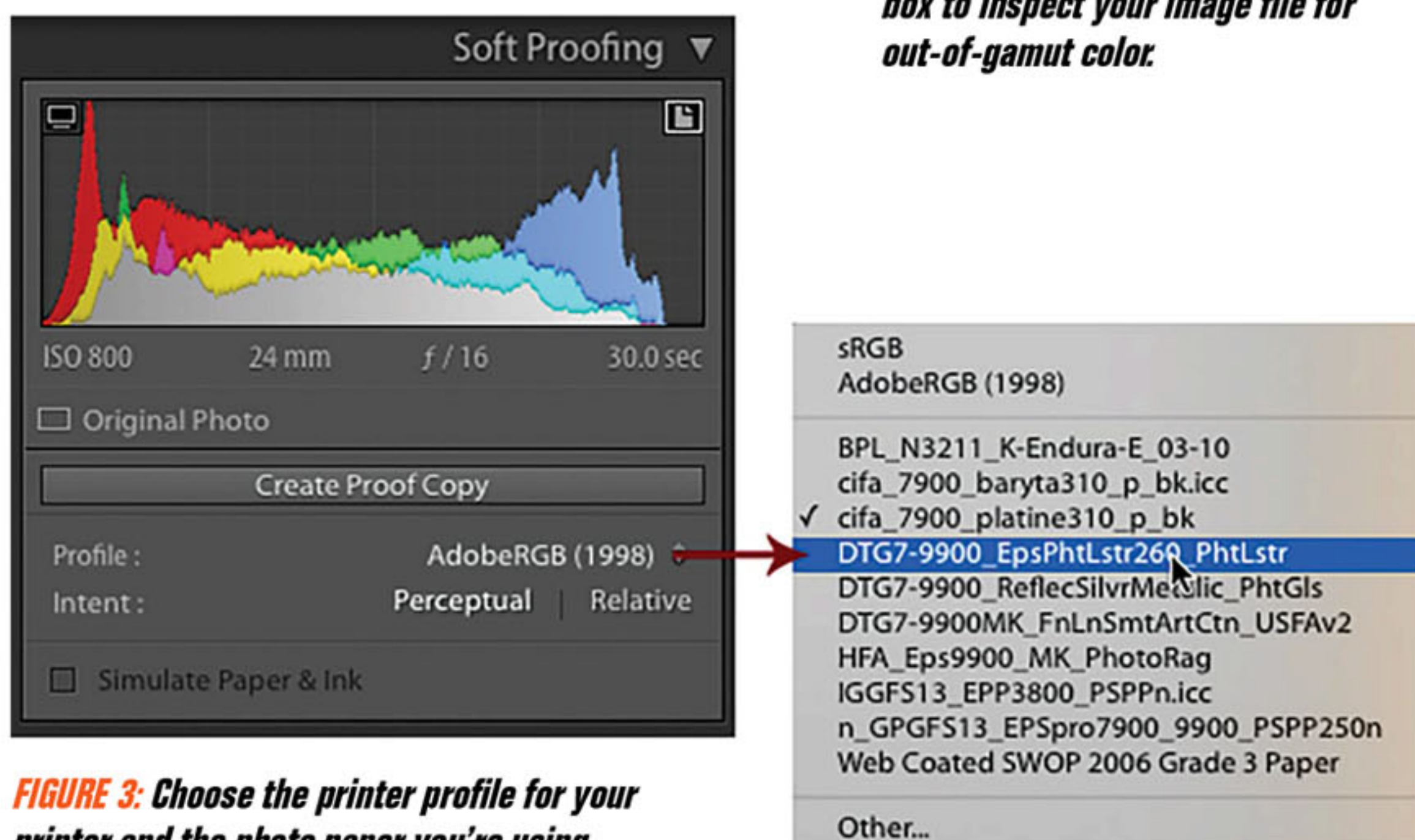


FIGURE 3: Choose the printer profile for your printer and the photo paper you're using.



FIGURE 4: Activate the Show Destination Gamut Warning to identify your out-of-gamut color

Step 2: Correcting Out-of-Gamut Color

Needless to say, you can print without soft proofing. The thing is, if you print a file with out-of-gamut color, that color will be interpreted—which is a fancy word for guessing. Soft proofing, thus, provides control, consistency and predictability.

When fixing out-of-gamut color, the goal, regardless of approach, is to change the color to something that's printable without the need for interpolation. The trick to doing this is to steer clear of global adjustments, meaning, don't use, say, the Saturation slider in Lightroom, as it will shift the saturation of all the colors in your file, not just your out-of-gamut ones. Thus, think in terms of performing localized adjustments.

1. One way to change color is to change its hue. While in Lightroom's Develop Module, open the HSL Panel, and click on the Hue section. Next, select the Targeted Adjustment tool, which turns your cursor into a crosshair. You then can click directly on your out-of-gamut color and click-and-drag your mouse up or down to change the hue of that color (Figure 5). Of course, keep your out-of-gamut clipping warnings active to see the red gamut warning fade or disappear as you go.
2. You also can change a color by changing its level of saturation. With this approach, do everything almost exactly the same as in the last step, but instead of selecting the Hue section, select Saturation. Then, focus on desaturating your out-of-gamut color, which I've found to be the more effective way to bring color into gamut. Alternatively, you can desaturate a specific zone by using your Adjustment brush. Activate the brush, move your Saturation slider to the left and begin brushing over the area with out-of-gamut color.

NOTE: As you adjust an image while soft proofing, Lightroom will ask you after your first adjustment if you'd like to create a virtual copy of your soft proof. You can choose to Create Proof, or to Make This a Proof. Making the virtual copy creates a copy that's dedicated to the changes made for print output only (Figure 5a).

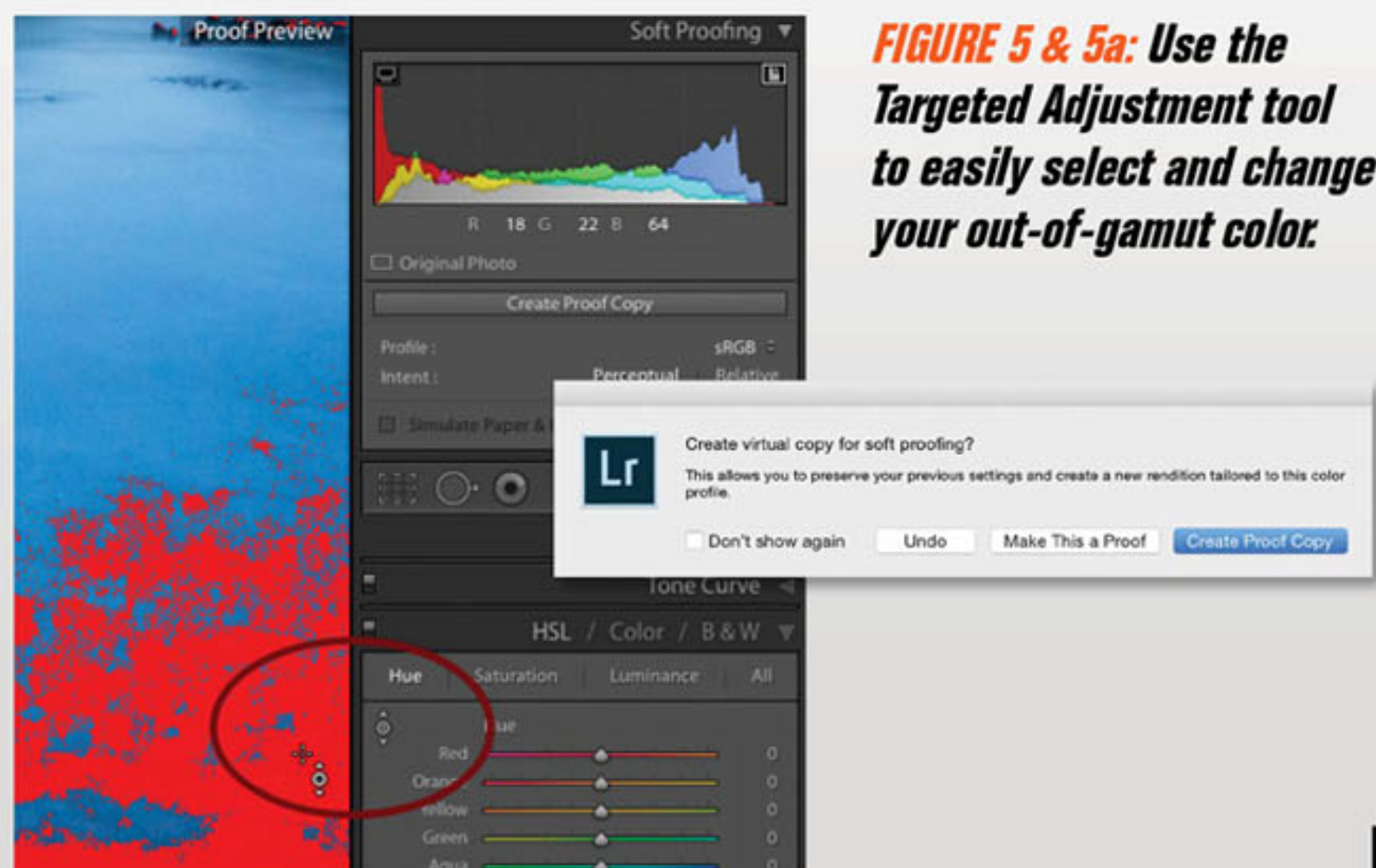


FIGURE 5 & 5a: Use the Targeted Adjustment tool to easily select and change your out-of-gamut color.

Step 3: Page Setup

After your soft proof, it's time to go to Lightroom's Print Module to begin configuring the settings for your print. In the lower-left corner of the Print Module, you'll find the Page Setup button, which launches the Page Setup dialog box when clicked (Figure 6). Your two goals for this step are simple: Select the printer you're going to use and the paper size you're printing on, be it roll paper or a cut sheet.

Step 4: Print Settings

Just to the right of the Page Setup button is the Print Settings button, which launches the Print dialog box for you to configure. Again, setting locations may vary, but my goal is locating the Printer settings as shown in Figure 7. The objectives for Printer settings are to set the media type, turn color management off, make sure I'm printing with 16-bit output, and set the output resolution. Next, you'll want to find where you can set your Platen Gap.

Printer Settings: Here, the media type is set to Premium Luster Paper (260), but knowing the right setting for your media type likely will be a mystery to those printing for the first time. The easiest way to know is to go to your paper manufacturer's website, and find a data specification sheet or a "Read Me" file that provides their recommendation. You always can call the manufacturer if you find the information difficult to locate. Next, make sure you're printing with 16-bit output. Note that this setting is of no use if you're printing JPEGs, which are inherently 8-bit.

Color management should be turned off because we don't want the printer managing the color. The whole point of covering the use of ICC profiles in the last article was to gain control and consistency of our printing. So turn color management off, and in another workflow step, we'll point to the ICC printer profile. Lastly, I suggest using an output resolution of 2880 dpi. Most printers can be set higher, but it's not needed for photo prints and can greatly slow things down.

Platen Gap: While many photographers get away without worrying about the Platen Gap, it becomes important with two scenarios: if you get into using thick or heavy-weighted papers, or if you ever experience what's called a "head strike." A head strike is when your print head (the thing that spits the ink out onto the paper) makes contact with the paper as it moves back and forth along the paper. The results are usually ink splotches or streaks left on your print—usually on the edge of the paper. Head strikes happen, and the best way to fix the problem is by setting your Platen Gap accordingly.

The goal when configuring your Platen Gap is to have the print head as close to the paper as possible without touching or striking the paper. It's best to refer to your printer's manual for their recommendations on how to set the paper thickness. Options are usually to play with increasing your Paper Thickness settings, your Paper Suction settings (many printers have vacuums pulling the paper into the printer body to keep them flat as they run through the printer), Platen Gap settings and Roll Paper Back Tension settings (Figure 8).

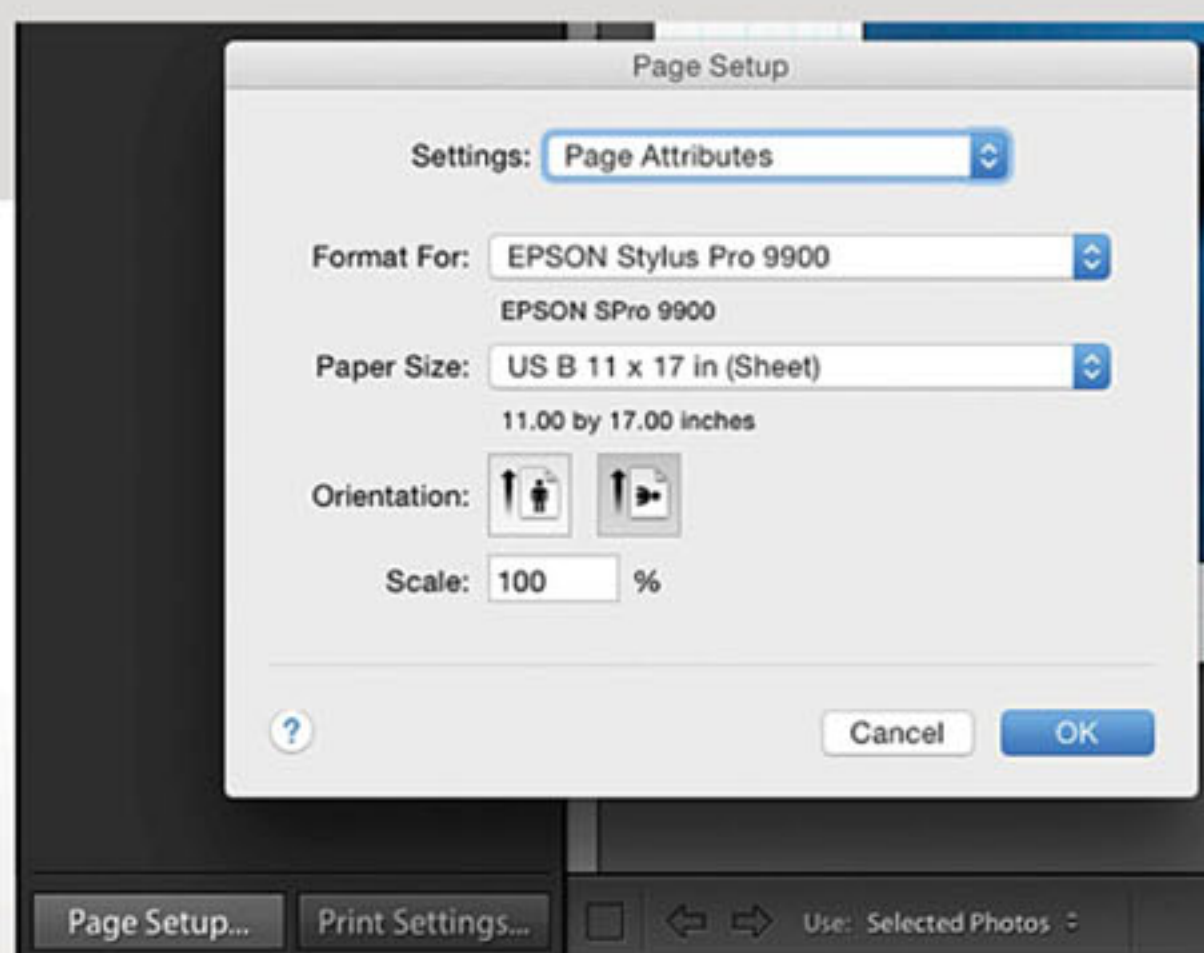


FIGURE 6: Click the Page Setup button to choose the printer and paper you're using.

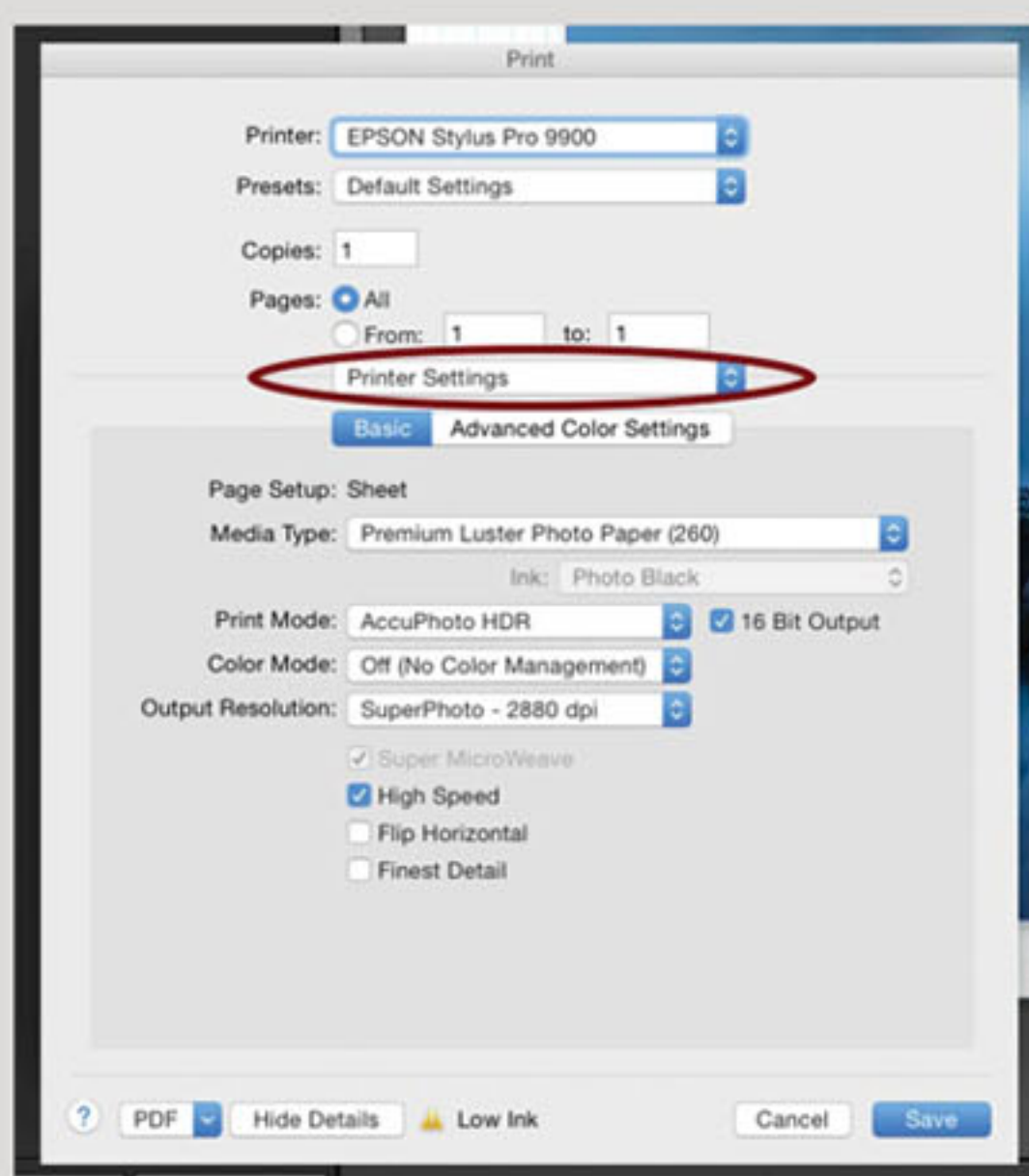


FIGURE 7: The Print dialog is where we configure settings such as the media type we're using, where we turn on 16-bit output and turn off color management, and where we set the print resolution.

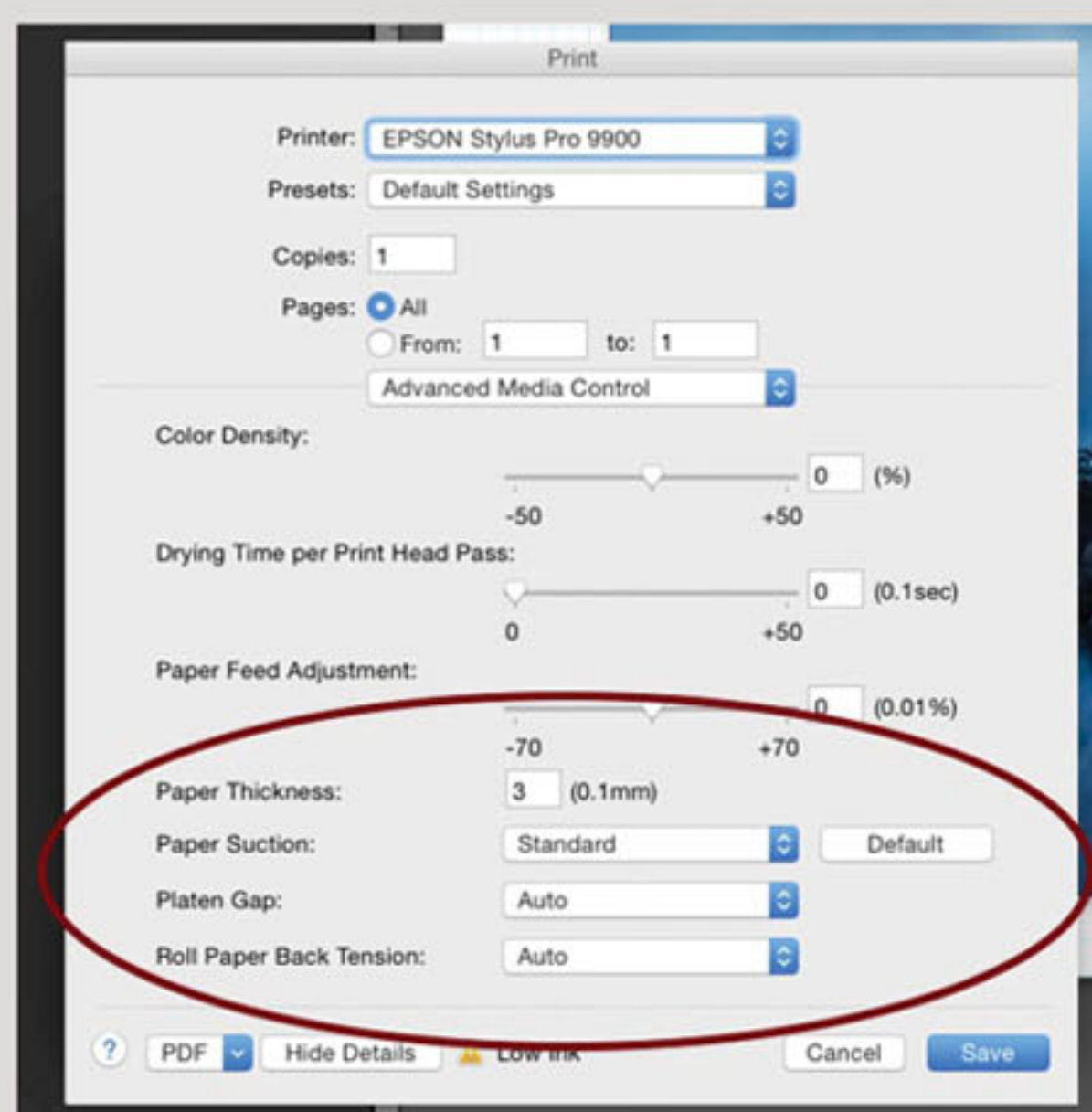
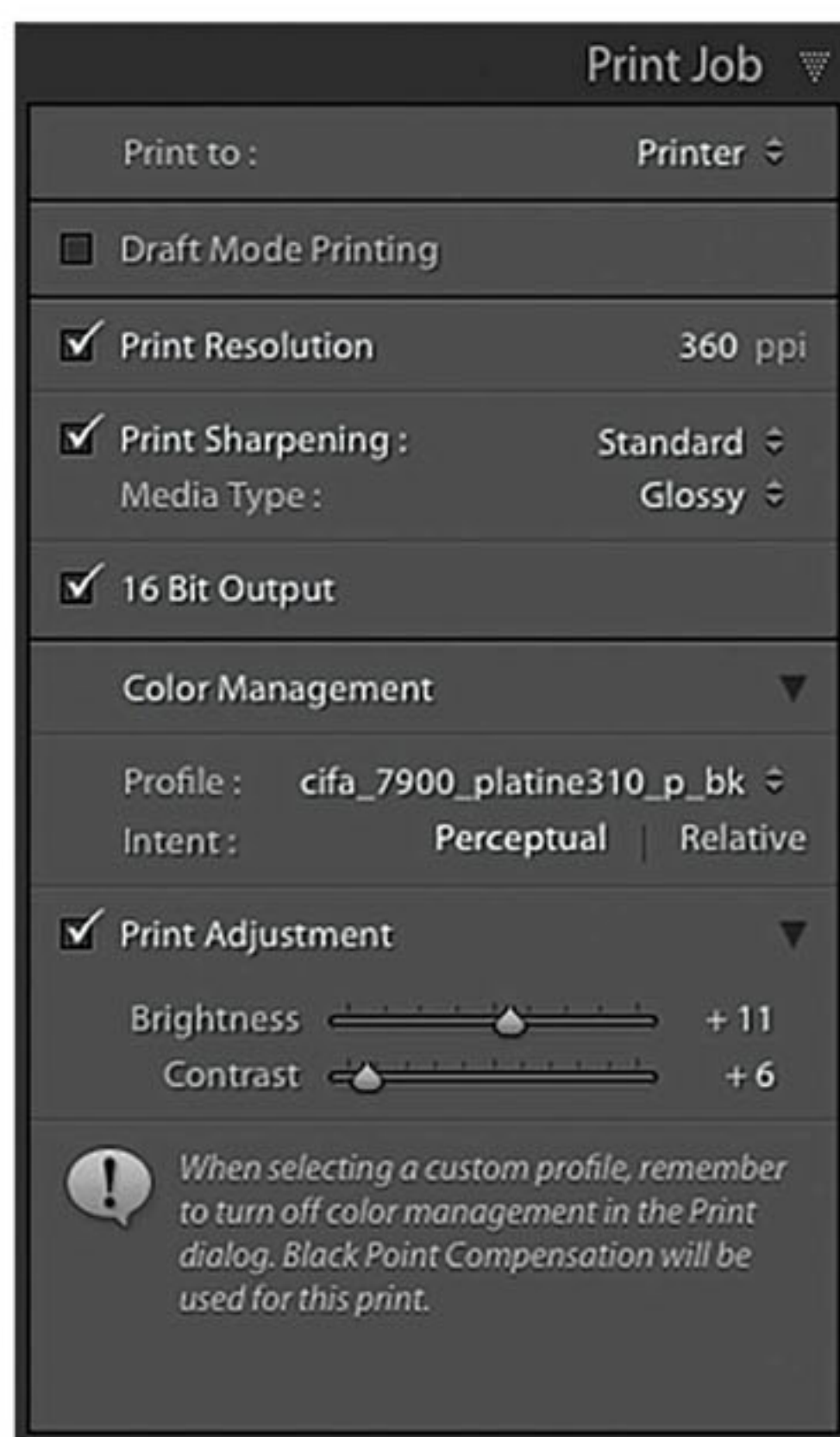


FIGURE 8: We also need to configure settings around the thickness and density of the paper we're using through these settings.

Step 5: Setting Your Printer Profile and Output Sharpening

Next, go to Lightroom's Print Job panel found in the lower right of the Print Module (Figure 9). Essentially, this panel controls the settings Lightroom uses to export a file before it goes to print. First, set the Print Resolution. I suggest setting Canon printers to 300, and to 360 for Epson; each of those will match the dpi capability of the Canon and Epson print heads. Next, set Print Sharpening, then 16 Bit Output, and then for Color Management, set the printer profile for your specific printer model and for the specific paper you're printing on.

FIGURE 9: In addition to configuring settings with the print driver as in the last couple of figure references, we also need to configure settings for how Lightroom exports our image in the Print Job panel.



Workflow Summary

To borrow again from my last article in this series, I suggest that you begin creating consistency and control of your printing by incorporating ICC color management into your routine. Calibrate your display, get your printer profiles from your paper manufacturer and install them. Then, once your image is developed to your liking, go through the following steps:

- Soft-proof your image to make sure all your colors are in gamut
- Make any corrections needed to bring out-of-gamut color in gamut
- Choose the paper size you're printing on, and the printer
- Print settings
- Printer settings
- Set your media type
- Set your output to 16-bit
- Turn off color management
- Set your resolution to 2880 dpi
- Set the Platen Gap
- Tell your printer the paper thickness you're using
- Set the amount of paper suction
- Set the roll paper back tension (not needed if printing on cut sheets)
- Set your printer profile and output sharpening

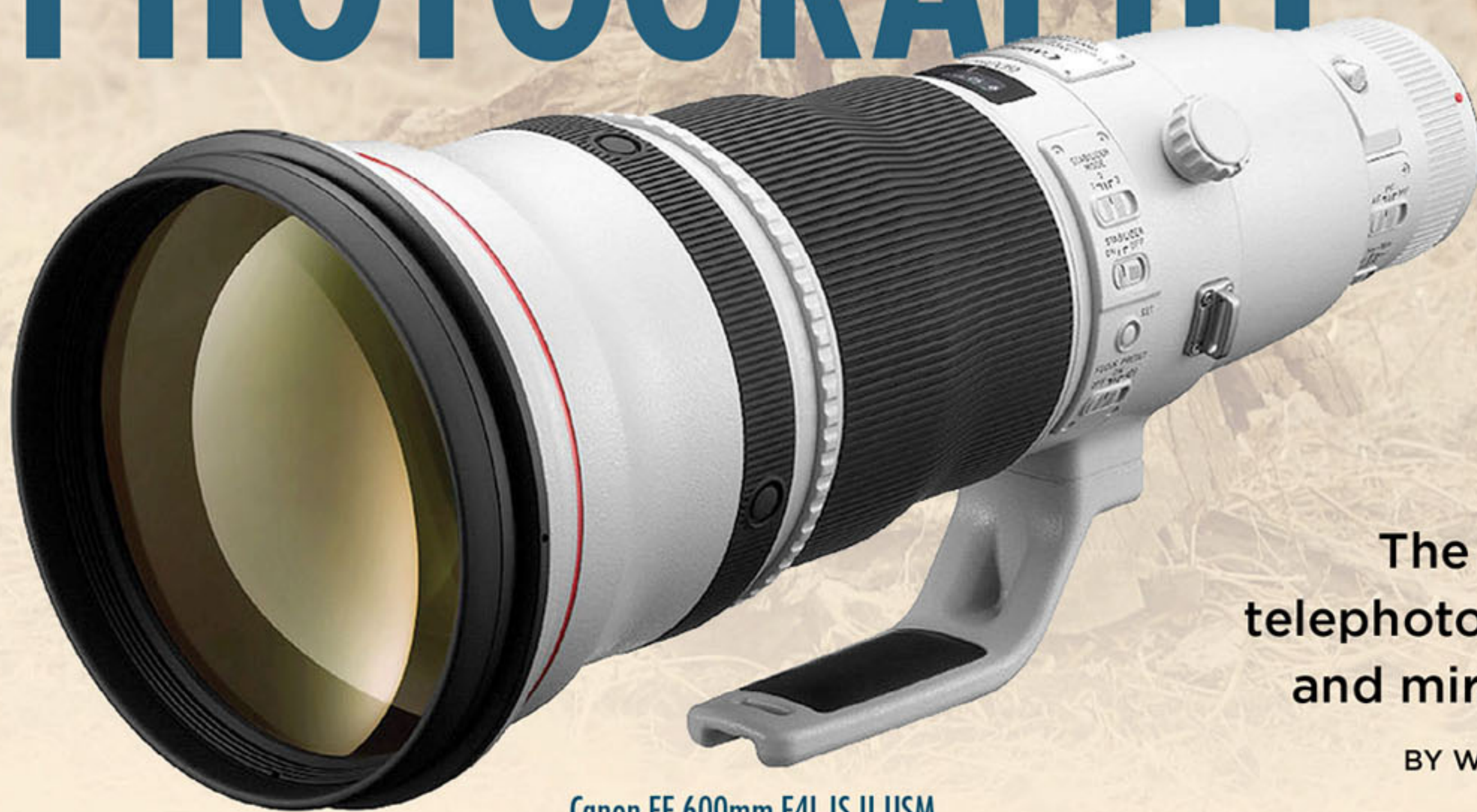
Digital printing is admittedly a technical endeavor. The days of printing creatively, with dodging and burning, with contrast masks and other techniques, are out the window with digital; all those creative steps are done in the Develop Module of Lightroom today. Once you've gone through these steps a few times, I promise you, printing digitally is easy. It will make you faster than ever, more consistent than ever and, ultimately, more productive than ever. **OP**

Native Print Drivers Versus RIPs

The examples given here for configuring the printer settings are by way of using the Epson Print Driver. However, you may have heard of the option of using something called a RIP, or Raster Image Processor. In a nutshell, a RIP is a printer driver on steroids. In theory, it does everything better and faster than the native print driver, including giving you better overall print quality. There are many RIPs on the market, however, and not all are created equal or worth the buy. In fact, unless you're a professional printer, I would suggest not even looking into RIPs as an option. The gap between the qualities of the best RIPs versus using native print drivers has shrunk dramatically in recent years. Personally, I use a RIP called ImagePrint some of the time, but a lot of my printing is done straight through Lightroom and my printer's native print driver. The quality is great, and unless I need to gang-run many images at once, Lightroom printing handles things pretty well.

Jason Bradley is a nature and underwater photographer from Monterey, California. He owns and operates Bradley Photographic Print Services and Bradley Photographic Workshops, and is the author of "Creative Workflow in Lightroom" by Focal Press. To see more of Bradley's work, visit his website at BradleyPhotographic.com.

LENSES FOR WILDLIFE PHOTOGRAPHY



Canon EF 600mm F4L IS II USM

The OP guide to
telephoto optics for DSLRs
and mirrorless cameras

BY WILLIAM SAWALICH

When it comes to selecting lenses for wildlife photography, the first thing most photographers look for is focal length—a long lens that can reach out and cover great distances, bringing animals in for close-ups—but other features are also incredibly useful. Vibration reduction makes lenses more easily handholdable, especially in low light, and a large maximum aperture, such as $f/2.8$, is also helpful for shooting in low light and at fast shutter speeds. Alternatively, if size is a consideration—and extreme telephoto lenses are big—variable maximum apertures, which change with the focal length, make lenses compact, lighter and more affordable. Here's a rundown of practically all the telephoto zoom and prime lens options for wildlife photographers using DSLRs and compact mirrorless cameras.

Canon

Wildlife photographers regularly encounter nasty weather, not to mention the normal wear and tear and dust and dirt that accompany working outdoors. Canon L-series lenses feature improved weather sealing and rugged build quality to withstand the rigors of professional sports and wildlife photography. The **Canon EF 100-400mm $f/4.5-5.6$ L IS II USM** is an L lens that manages to cover the telephoto spectrum while remaining fairly compact and light thanks to the variable $f/4.5-5.6$ maximum aperture. At \$2,100, it's also a relatively affordable way to reach long telephoto lengths.

The **Canon EF-M 55-200mm $f/4.5-6.3$ IS STM** is a telephoto zoom for the EOS M compact mirrorless camera system. Built-in optical image stabilization provides 3.5 stops of stability, meaning, in theory, you should be able

to handhold this compact lens—which offers a full-frame-sensor equivalent of 88-320mm—at shutter speeds as slow as $1/30$ sec., even at the full telephoto end of the zoom range. The estimated retail price is \$350.

Serious wildlife shooters will go crazy for this extreme telephoto zoom lens from Canon. It's the **EF 200-400mm $f/4$ L IS USM Extender 1.4x**, and along with being a fixed $f/4$, it's the first ever to sport a built-in 1.4x tele-extender. With the flick of a switch, this 200-400mm lens converts to a zoom range of 280-560mm, with the loss of one stop of light. The lens also offers four stops of vibration reduction thanks to built-in optical image stabilization. The biggest obstacle is the price, at over \$10,000, but when you're getting a fast, sharp, relatively compact and versatile lens with a focal-range extender built in, it's a premium serious sports

and wildlife shooters are willing to pay.

Canon shooters who want the longest and fastest lenses available will look to the **EF 600mm f/4L IS II USM** and **EF 800mm f/5.6L IS USM primes**. The focal lengths offer extreme reach for photographing big game on safari or when access to animals is limited and an extreme focal length can fill the frame for an animal portrait even from a hundred yards away. In some national parks, regulations limit how close photographers can get to wildlife like bears and wolves. Having the ability to reach out across that 100-yard gap can be the difference between getting the shot and missing it. This reach, of course, comes with a price: nearly \$12,000 for the 600mm and \$13,000 for the super-long 800mm glass.

Fujifilm

Fujifilm has announced the **Fujinon XF100-400mm F4.5-5.6 R LM OIS WR**, a super-telephoto zoom for the X series of compact mirrorless cameras, which covers a tremendous focal range equivalent to 152-609mm. Five ED elements and one Super ED element fight refraction and chromatic aberration. Designed for outdoor use and hand-holding, the lens features five stops of optical image stabilization and a special fluorine coating on the front element to repel dust and moisture. The estimated retail price is \$1,900.

Nikon

What's better than a fairly typical 80-200mm or 80-300mm zoom lens? It's the **AF-S NIKKOR 80-400mm f/4.5-5.6G ED VR** from Nikon, of course. This variable maximum aperture f/4.5-5.6 telephoto zoom reaches 30% farther than an 80-300mm zoom would—bringing you significantly closer to the wildlife you're watching. The lens features four ED, extra low-dispersion elements and one "super ED" element with Nikon's nano-crystal coating designed to minimize chromatic aberration, especially when used at 80mm. The optical vibration-reduction system provides four stops of handholdability. The estimated retail price is \$2,300.

For telephoto reach in a compact package, Nikon DX camera users should consider the **AF-S DX NIKKOR 18-300mm f/3.5-6.3G ED VR superzoom**. It's an ideal one-stop shop of a lens, perfect for traveling photographers who want to

maintain small, light kits. The variable maximum aperture keeps it compact, and it covers a whopping 35mm-equivalent range of 27-450mm, making it possible to shoot everything from wide-angle landscapes to wildlife close-ups. The estimated retail price is \$700.

This lens may have a familiar focal range of 70-300mm, but it's not for full-frame DSLRs. It's the **NIKKOR VR 70-300mm f/4.5-5.6** for the Nikon 1 system. Its equivalent focal range is so large, at 190-810mm, it just may inspire wildlife photographers to switch to the compact mirrorless Nikon 1 line of cameras. Small and light for such a long zoom, the lens retails for about \$1,000.

One of Nikon's newest lenses is a super-telephoto zoom that covers a whopping range that's perfect for wildlife photographers, even on the short end. The **AF-S NIKKOR 200-500mm f/5.6E ED VR** has built-in optical vibration reduction, delivering 4.5 stops of additional handholdability, yet the

lens remains fairly compact thanks to the f/5.6 maximum aperture, which is constant across the zoom range. The VR's "sport mode" is perfect for panning with a fast-moving subject—such as a bird in flight or a sprinting cheetah. The nine-bladed aperture helps to create pleasing bokeh in the out-of-focus area of an image, too.

For photographers with deep pockets who want tremendous telephoto reach, this pair of Nikon prime telephotos is perfect for wildlife photography. The **AF-S NIKKOR 500mm** and **600mm f/4E FL ED VR primes** offer powerful vibration reduction up to four stops, they have fast f/4 maximum apertures, they utilize Nikon's Electromagnetic Diaphragm to ensure consistent exposures from frame to frame during burst



AF-S NIKKOR 200-500mm F5.6E ED VR

Sigma 150-600mm
F5-6.3 DG OS HSM

Fujinon XF100-400mm
F4.5-5.6 R LM OIS WR

shooting, and while they won't be confused for compact primes, they utilize fluorite elements that not only reduce weight, but improve the optical quality of the glass. The magnesium frame is particularly durable for serious outdoor expeditions—which is especially important given the high cost of this prime glass. The 500mm lens retails for about \$11,000, and the 600mm lens is more than \$12,000.

Olympus

The **Olympus M.Zuiko Digital ED 14-150mm f/4-5.6 II** fits Micro Four Thirds camera mounts and provides an equivalent zoom range of 28-300mm, making it a compact superzoom that can do a little bit of everything. An updated version of an earlier lens, this model features the new ZERO (Zuiko Extra-low Reflection Optical) coating on the surface of the lens to eliminate scratches and reduce flare. At 3.27 inches and 10 ounces, it's a compact, go-everywhere, all-in-one traveling companion. The estimated retail price is \$400.

The newest lens in the M.Zuiko lineup is the **300mm f/4 IS PRO**. This compact super-telephoto lens fits Micro Four Thirds mounts and provides an equivalent focal length of 600mm. It may not be tiny, but it's significantly smaller than the typical 600mm equivalent. The lens is designed to resist the intrusion of dirt and water—essential when working outdoors for any length of time—and features ZERO optical coating and built-in image stabilization that can work with the sensor stabilization of the OM-D E-M1 and E-M5 Mark II cameras to provide a whopping six stops of steadying power. Even without in-camera stabilization, the lens alone provides four stops of stabilization. The estimated street price is \$2,500.

An updated 150-600mm equivalent, the **Olympus M.Zuiko ED 75-300mm f/4.8-6.7 II** is a compact super-telephoto at a low price. A variable maximum aperture of f/4.8-6.7 keeps the lens small, while updated ZERO optical coating helps fight lens flare and ghosting. MSC technology makes focusing faster and quieter when used in movie mode. The estimated retail price is \$550.

56 Outdoor Photographer outdoorphotographer.com



Olympus M.Zuiko
ED 75-300mm
F4.8-6.7 II

Sony 70-400mm
F4.5-6.3 G SSM II

Panasonic LUMIX G VARIO
100-300mm F4-5.6 MEGA O.I.S.

Panasonic

A strong telephoto zoom for the Micro Four Thirds lens mount, the **Panasonic LUMIX G VARIO 100-300mm f/4-5.6 MEGA O.I.S.** delivers a full-frame-equivalent 200-600mm focal range. Seventeen elements in 12 groups include an extra-low dispersion element to fight flare, and a seven-bladed aperture provides a pleasing shape to out-of-focus image areas. Optical image stabilization makes handholding this compact lens easier. The estimated street price is \$550.

Panasonic's partnership with Leica has produced an even more powerful telephoto zoom option for the Micro Four Thirds system. It's the **Leica DG Vario-Elmar 100-400mm f/4.0-6.3 ASPH super-telephoto zoom**, equivalent to a massive 200-800mm range on a full-frame sensor. Power O.I.S. steadies the lens for handholding, which is crucial at such long focal lengths, and

weather-resistant construction helps fight dust and moisture intrusion. Also, the 240 fps autofocus motor is fast and quiet, which, along with the optical quality of the lens, makes it perfect for capturing 4K video. The estimated retail price is \$1,800.

Pentax

The **Pentax HD D FA 150-450mm f/4.5-5.6 ED DC AW** from Ricoh has a name that's almost as long as its tremendous focal length. Designed to fit the Pentax K mount, this lens features three extra-low dispersion glass elements and one super-low dispersion glass element to fight chromatic aberration. The weather-resistant construction makes this long zoom ideal for wildlife photographers who shoot year-round. The variable f/4.5-5.6 maximum aperture helps keep the cost and weight down, too. It retails for about \$1,800.

If you're willing to sacrifice a bit of zoom reach in favor of faster glass, you may want to wait for the **Pentax D FA* 70-200mm f/2.8 ED DC AW telephoto zoom** for K-mount cameras. It has a fast, constant maximum aperture, great for

low-light shooting at fast shutter speeds necessary to photograph active wildlife. And, as part of the high-quality Pentax Star series, the lens features revamped optics including four extra-low dispersion elements and two super-low dispersion elements to minimize aberration and maximize sharpness across the frame, as well as Aero Bright Coating II on the elements for minimizing reflections and ghosting. Improved autofocus is faster and quieter, too. The estimated street price is \$2,300.

The **Pentax HD DA 560mm f/5.6 ED AW** is a massive super-telephoto prime with a constant f/5.6 maximum aperture and a long 560mm focal length. As if 560mm weren't already enough, this lens becomes a whopping 859mm equivalent when used on APS-C K-mount cameras. HD and SP lens coatings improve clarity and maximize sharpness while minimizing

flare and ghosting. The lens includes a drop-in circular polarizer, perfect for deepening blue-sky backgrounds and seeing past glare to let the true colors of a scene come through. The estimated street price is \$5,000.

Sigma

Designed for use with APS-C cameras from Canon, Nikon, Pentax, Sigma and Sony, the **Sigma 18-300mm f/3.5-6.3 DC Macro OS HSM Contemporary lens** is an all-in-one extreme zoom with an equivalent 27-450mm focal range. Built with four FLD glass elements and one SLD glass element, the lens minimizes chromatic aberration, particularly when used at the telephoto end of its range. Optical stabilization helps with handholding. The estimated street price is \$579 (OS/Optical Stabilizer not available on Pentax/Sony mount).

For a strong telephoto zoom range and a fast and constant maximum aperture, Canon, Nikon and Sigma camera owners should check out the **Sigma 120-300mm f/2.8 DG OS HSM Sports super-telephoto zoom**. The original lens built for Sigma's Sports category, it features optical stabilization, internal focusing and a Hyper Sonic Motor for fast and quiet autofocus. The build quality is high on this lens to fight the dust and moisture wildlife shooters encounter. The lens is also highly customizable through Sigma's USB dock. The estimated street price is \$3,599.

Sigma offers **Contemporary** and **Sports** versions of its **150-600mm f/5-6.3 DG OS HSM super-telephoto zoom**. Wildlife photographers may prefer the Sports model, which is slightly larger, but features more rugged construction and more elements than the Contemporary model—two FLD and three SLD elements, as opposed to one and three, respectively. The built-in optical image stabilization uses an accelerometer for improved panning, both horizontally and vertically. Enhanced autofocus and a Hyper Sonic Motor ensure fast and quiet focusing, while a manual override switch provides maximum control. The lens is available for Canon, Nikon and Sigma mounts, and is customizable via the Sigma USB Dock. The estimated street prices are \$989 (Contemporary version) and \$1,799 (Sports version).

Sony

The **Sony FE 24-240mm f/3.5-6.3 OSS superzoom** for full-frame E-mount cameras provides a huge 10X zoom range, making it an ideal travel partner for photographers who traded in large DSLRs for Sony's compact a7 line. Capable of everything from wide to telephoto, the 24-240mm packs a lot of versatility into a fairly compact lens—it weighs 1.72 pounds and is just shy of 4.7 inches in length. Used on an APS-C camera, its equivalent focal range is 36-360mm. Optical Steady Shot vibration reduction, or OSS, makes it easier to handhold this lens when zoomed to 240mm or when working in low light. Its estimated street price is \$1,000.

Wildlife photographers who use Sony A-mount cameras will be interested in the **70-400mm f/4-5.6 G SSM II**

telephoto zoom. An upgraded version of a previous model, the lens features improved coatings for fighting flare and minimizing ghosting, plus faster autofocus performance. When used on an APS-C camera, the lens turns into a powerful 105-600mm zoom. Its estimated retail price is \$2,200.

Dedicated wildlife and sports photographers want fast telephoto primes like the **Sony 300mm f/2.8 G SSM II** for A-mount cameras. The challenge with fast glass is that it can be big, because large elements let in lots of light, but with its constant f/2.8 maximum aperture, this lens makes up for its size when it comes to low-light and fast shutter speed performance. Used on an APS-C camera, it turns into a whopping 450mm equivalent. Sony's ultrasonic SSM focus motor is fast and silent, so it won't scare skittish subjects. The estimated retail price is \$5,300.

Tamron

Users of APS-C cameras from Canon, Nikon and Sony have a great option for an all-in-one extreme zoom lens that's also great for wildlife. It's the **16-300mm Di II VC PZD Macro zoom** from **Tamron**. Equivalent to a focal range of about 25-480mm, this lens is fairly compact, especially given its equivalent telephoto power and optical stabilization. It's a do-it-all lens, with even macro capability, and it's great for the traveling photographer on a budget. The estimated retail price is \$650.

A great value for full-frame Canon, Nikon and Sony shooters, the **Tamron SP 150-600mm Di VC USD super-telephoto zoom** provides a versatile range at an accessible price. Vibration compensation helps steady shots when working at the long end of the focal range, and the variable maximum aperture helps to keep the lens compact—at least by 600mm telephoto standards—and to keep the cost down, too. The estimated retail price is \$1,100. **OP**

Resources

Canon usa.canon.com

Fujifilm fujifilmusa.com

Nikon nikonusa.com

Olympus getolympus.com

Panasonic shop.panasonic.com

Pentax (Ricoh) us.ricoh-imaging.com

Sigma sigmaphoto.com

Sony store.sony.com

Tamron tamron-usa.com



GEAR FOR Wildlife Photography

BY THE EDITORS

Accessories to improve your success photographing wild animals

Wildlife photography presents unique challenges. Extreme patience is often needed, so you'll want protection from the elements for you and your gear, as you may be waiting for long periods. Most wildlife is also wary of human presence, making it necessary for us to conceal ourselves and to photograph from long distances, requiring big lenses that need extra protection and support. We asked pro wildlife photographers to share some of their favorite accessories to make wildlife photography more enjoyable and successful. Here are some key items to consider.

Gimbal Head

The significant weight of telephoto lenses makes them difficult to support with a standard tripod head—tilting them up or down changes the center of gravity and can cause your tripod to tip. The design of a gimbal head like the **Wimberley Gimbal Head WH-200 II** keeps the center of gravity balanced, allowing you to easily position heavy telephotos and smoothly track moving subjects without compromising stability. The Wimberley head is expensive, but it's widely recognized by professionals as the best. List Price: \$595. tripodhead.com



Long-Lens Camera Bag

Protection for your expensive telephoto lens and camera is a primary concern. A bag like the **Lowepro Lens Trekker 600 AW III** allows you to carry a 600mm super-tele with your camera attached or an 800mm lens detached from the camera. The customizable padded interior includes a lens collar to support and secure your lens. To shield your system from wet conditions, the bag includes a built-in All Weather (AW) cover. List Price: \$299. lowepro.com



Lightweight, Sturdy Tripod

Adequate support for your camera and heavy telephoto lenses is essential for sharp wildlife photos. The **Really Right Stuff TVC-33 (Series 3) tripod** can get low to the ground—just 4.1 inches—or extend to a maximum height of 58.6 inches. It can support up to 50 pounds of equipment, ample for even the heaviest pro DSLR and telephoto combinations. This carbon-fiber tripod weighs just 4.3 pounds and collapses to 25.6 inches in length when folded. List Price: \$925. reallyrightstuff.com

Photo Blind

A popular way to hide yourself from wary wildlife is to use a blind. There are a wide variety of options available, from small, solo solutions to more spacious, sophisticated models like the **L.L. Rue Ultimate Photo Blind**, which can accommodate two photographers working side by side or one photographer with dual camera setups. The cotton/polyester and stainless-steel blind takes only a few minutes to set up and features two large snouts through which to shoot, six screened windows for wildlife spotting and three additional slits to allow photography from five sides of the hexagonal blind. List Price: \$339. rue.com



Camera Trap

One way to photograph animals that typically avoid humans is to use a camera trap. **Hähnel's Captur Module - Pro** is a versatile solution for wildlife photography that can be used as a wireless remote shutter release from up to 100 meters, has built-in light, sound and motion sensors, and includes the Module - IR, which can be mounted to a tree, creating an invisible beam, and, when crossed, will trigger your camera's shutter. Estimated Street Price: \$119. rtsphoto.com

Binoculars

Trying to spot wildlife through your telephoto lens can be difficult due to its narrow field of view. An 8x42 binocular like the **Nikon PROSTAFF 7S 8x42** is an ideal balance between magnification and light gathering for wildlife spotting, providing a bright image even in lower-light conditions. They're waterproof and fog-proof, rubber-coated for enhanced durability, and offer a 6.8° field of view, translating to 357 linear feet at 1,000 yards. List Price: \$189. nikonsportoptics.com



Gear Camo

Many wildlife photographers wear camouflage clothing or even military-style ghillie suits. If you also want to conceal your camera and lens, **LensCoat** offers a wide variety of camo covers like the **RainCoat 2 Pro**, which provides protection for your camera and lens from wet conditions without obstructing access to your camera and lens controls. It comes with an included hood extension sleeve for super-telephoto lenses. List Price: \$124. lenscoat.com

Camera Holster

When you're tracking wildlife on foot and want to move nimbly by shooting handheld, a waist-mounted camera holster takes the weight of your heavy telephoto lenses off of your neck and shoulders and places it more comfortably around your waist. The **SpiderPro camera holster** can carry up to two pro DSLRs with lenses attached, using a unique ball-joint system that attaches to your camera's tripod socket to secure your camera to the belt, without compromising your ability to quickly draw it and compose your shot. SpiderPro is available in single- or dual-camera designs. List Price: From \$135. spiderholster.com



Vehicle Support

Your car can serve as a convenient, mobile blind for wildlife photography, and even can be more effective with the right camera support. The **Kirk Window Mount** clamps inside your window to provide a stable platform from which to photograph in the comfort of your vehicle. Add your own tripod head, and the solid aluminum Window Mount can support extreme telephoto lenses. Retractable front legs allow it to be used as a low-height support on flat surfaces, as well. List Price: \$249. kirkphoto.com

Headlamp

Wildlife photography often means being in the field to scout your location before dawn. A headlamp like the **Petzl TIKKA XP** provides hands-free illumination for enhanced safety and visibility. This multi-beam model features both wide and focused beams that can be used together or independently, plus a red beam for close-up illumination that preserves your night vision. List Price: \$49. petzl.com



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Participating in a safari to East Africa is high on the list of experiences for many wildlife photographers. Whether you're a first-time traveler to East Africa or a seasoned pro, there are universal challenges to be addressed in the planning and execution of your trip.

I spend roughly two months every year in Africa. What I'll share with you comes from a background of hard-earned experience. Having grown up in Tanzania in the 1960s, I have a deep love for the country, its people and the stunning array of wilderness locations to photograph. The year 2016 officially marks my 30th year of leading photographic safaris to Tanzania, so it's with great pleasure that I write this article dedicated to photographing wildlife in Tanzania.

Following are the top considerations that will directly affect the success of your adventure. The first line of ques-

tions inevitably deals with camera gear. Here are some ideas that help keep me comfortable, safe and ready to execute to the best of my ability when photographing on safari.

Equipment to Bring

Most photographers on a serious photo safari will use top-of-the-line professional equipment. Brand doesn't matter—they're just tools to help you reach your desired goal. About 95% of the shots I keep from a safari are taken with a 600mm lens and often with a 1.4x, 1.7x or 2x teleconverter. I never photograph from blinds or feeders, and don't bait animals, so this equipment gives me the best chance to capture intimate moments of animal and bird behavior.

I have a second camera body paired with a 100-400mm lens for a wider view. There are also rare chances to make effective fisheye shots, so I carry an 8-15mm for those. I don't take a

flash, and I never bring a tripod. Beanbags tend to fall on the floor or out of the vehicle in bumpy conditions, and they always seem to be under the seat or in the other vehicle just when they're needed. I use a Todd-Pod roof mount with an original version Wimberley head for all safari vehicle photography. It gives the best angle of view and the smoothest pan for following fast action.

Typically, people tend to bring much more equipment than this. The problem: Lots of equipment equals lots of choices. While you're making the choice and finding the right combination, you've just missed the fleeting moment of peak action. On one of our photo safaris, the seven-seat, four-wheel-drive vehicles only have three photographers each, so everyone has ample space for equipment, access to two side windows and their own roof hatch. With your camera bag on the seat beside you, it's easy to grab the proper gear for each new photo situation.

ON SAFARI IN TANZANIA

TEXT & PHOTOGRAPHY BY TODD GUSTAFSON

Exotic wildlife and landscape photography awaits in East Africa



Packing Tips

Make sure your camera bag is within airline-size standards, and never put your big lens in checked baggage. That goes for main camera bodies and medicine, as well. Ask yourself, "If my checked baggage is lost, can I still have a successful photo safari?" Your camera bag will be heavy, but don't look like you're struggling with it. Smile and be polite to the airline staff.

Transportation

There are lots of different options for safari vehicles. Stay away from vans. They're too small and have limited access to rough terrain. Four-wheel-drive Toyota Land Cruisers are my favorite vehicles, but make sure you don't get one that has a pop-up roof. The roof will give you shade, but the roof supports are guaranteed to be in the way and affect your shots every day.

Choosing Accommodations

When it comes to your choice of accommodations, there are hotels, luxury lodges and permanent or mobile tented camps. All will have comfortable beds, in-suite bathrooms and showers, laundry facilities, attentive staff and good food. With prior notice, the cooks can accommodate dietary needs.

Camps operate off of generator and solar power. If there are specific hours of operation, they will do their best to accommodate photo groups' charging needs. Most equipment we bring charges at both 110- and 220-volt. East Africa uses the UK plug style with its three big square prongs. Keep in mind that people will have lots of the same equipment, so it can be difficult to identify your gear at a community charging station. I put a colored sticker on each piece of electronic gear. Most accommodations also will have some form of Internet access.

Photographing on Safari

You've arrived, have all your gear and are officially on safari! A typical day will begin at 6:30 a.m., with cookies and coffee or tea before you start your game drive. Having cleaned and charged all of your equipment the night before, you're ready for anything!

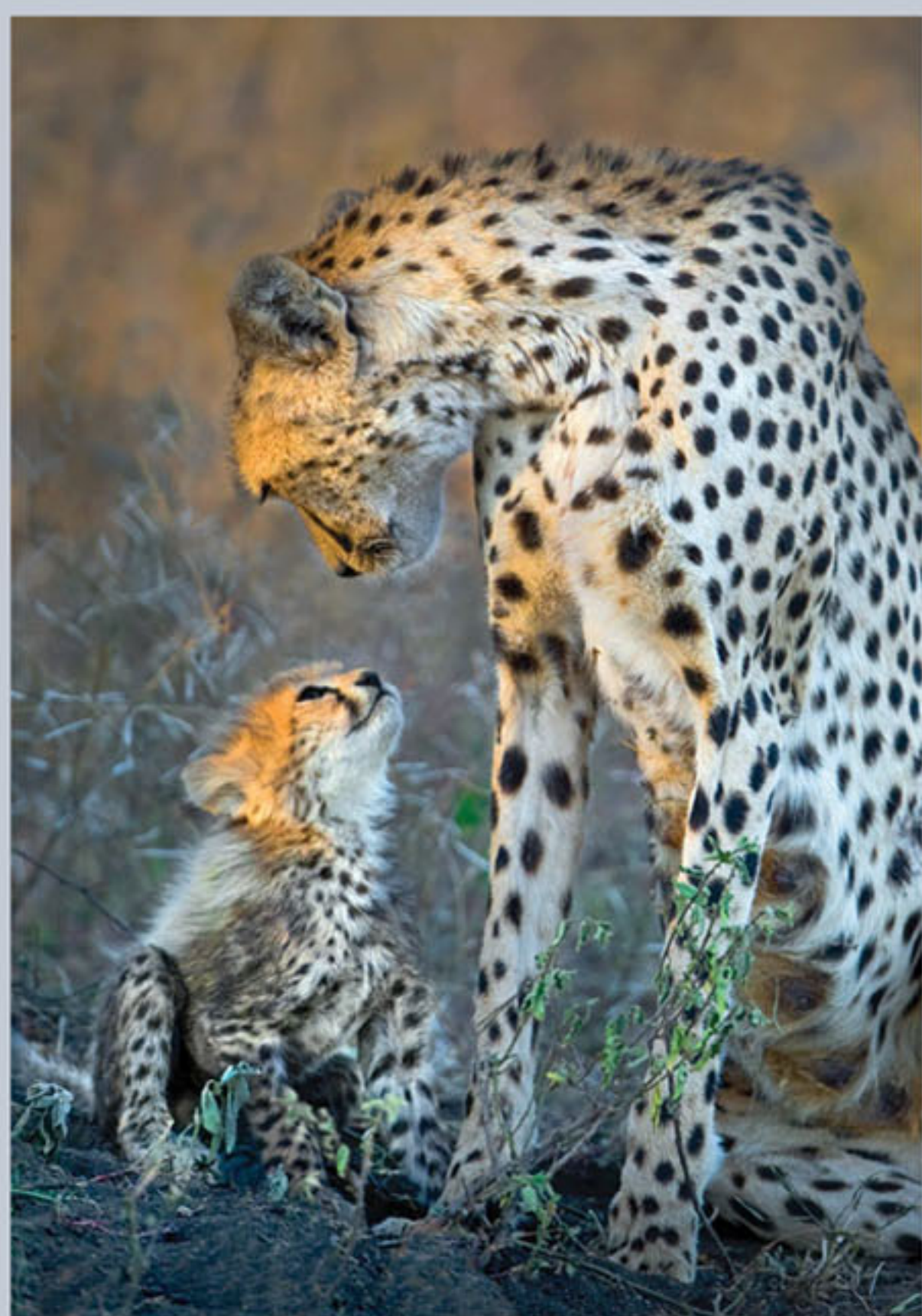
Your main goal is to scout for interesting subjects to photograph when the light comes up. Midday should be spent editing and resting. Afternoon safari drives are typically from 4:00 p.m. to 6:30 p.m. New photographers often will want to stop for anything that moves to get a "record shot." That's fine, but get it and move on. In the evolution of a safari, those stops will become a thing of the past.

I often see safari photographers frustrated early in the trip. One of the main culprits is the burning desire to get every shot available so their photo safari of a lifetime can be a success.



Wildebeest and Rainbow, the Serengeti, Tanzania

Nikon D4, AF-S NIKKOR 600mm f/4G ED VR, Nikon AF-S Teleconverter TC-17E II, f/8, 1/500 sec., ISO 1000



There are often unrealistic expectations of filling a portfolio in the first few days of a safari. Relax—let the safari come to you. In East Africa, there are so many dramatic subjects in perfect situations that if you miss one opportunity, there's another just around the next bend in the track. Be ready for it.

Hiring Drivers and Guides

With all of your cameras and lenses within reach and some of the world's finest wildlife subjects just outside your vehicle, consider the most important factor in your photographic success: your driver. He's the one who will get you safely to the best vantage points to capture the peak of action and take care of your daily needs every step of the way.

It's vital that you establish a cordial relationship that can foster mutual respect and trust. Ask about his family. What's his favorite animal or bird species? On most safaris, drivers take tourists to see the animals and the idea is to get as close as possible. That's not always the case with big-lens photographers. It's not a bad idea to have him look through your long lens so he can better understand your photographic view and properly place the vehicle more quickly. You need to be able to trust your driver to get you to wildlife situations that interest you, and he needs to trust where you would like him to safely place the vehicle.

After shooting in one spot for a while, if the action slows down, I'll often ask my driver if he can see a better place

Tips For A Successful African Adventure

1. An in-focus, well-exposed photo that includes a great subject isn't necessarily a great image. If the photo you're taking is a portrait, strive for the best head angle, facial expression and eye contact.
2. If you have a group of animals or birds, look for interesting head positions and eye contact.
3. The most effective photos of two or three subjects will contain two or three sets of eyes.
4. Add enough grass on the bottom of the frame to provide space for "virtual legs."
5. Remember to check the edges of your frame for unwanted distractions.
6. Sometimes the best angle of view is from the lower window of your vehicle.
7. Edit your images after every game drive—then back them up.

for us to be. Usually, he'll say, "Yes, there is more action over there...." An example of drivers trusting our decision: There were two lions sleeping on a lakeside meadow. Our driver wanted to show us flamingoes in another location. I saw 1,000 wildebeest coming at a run. "Wouldn't it be great if they ran right to the lions and there was a chase through the water?" Our driver trusted us, stayed, and the resulting pictures were stunning!



Understanding Animal Behavior

Knowing what your subject is likely to do in a given situation can give you a huge advantage in knowing where to be for the next dramatic action. A cheetah with four babies was resting in bushes. Vehicles were positioned to give clients a view that was partially obscured. We stayed away so we would have a view when she moved. She got up, stretched, went to the open space and gazed down at one of her cubs.



***Cheetah and Cub,
Ndutu, Tanzania***

Nikon D4, AF-S NIKKOR
600mm f/4G ED VR, Nikon
AF-S Teleconverter TC-17E II,
f/8, 1/1600 sec., ISO 1000

***Elephants at a Pool,
Tarangire, Tanzania***

Nikon D3, AF-S NIKKOR
80-400mm f/4.5-5.6G ED VR,
f/11, 1/1000 sec., ISO 1600

***Lion Hunt,
Ngorongoro Crater, Tanzania***

Nikon D4, AF-S NIKKOR
600mm f/4G ED VR, Nikon
AF-S Teleconverter TC-17E II,
f/8, 1/1600 sec., ISO 1000



Hyena and Cape Buffalo, Ngorongoro Crater, Tanzania

Nikon D2X, AF-S NIKKOR 600mm f/4G ED VR, Nikon AF-S Teleconverter TC-17E II, f/8, 1/60 sec., ISO 3200

Previsualize

Before you go on safari, you should have an idea of what images you would like to make. Here are two very different lists of hoped-for safari shots.

List #1: Elephants, a lion, a cheetah, zebras, a rhino, birds, a giraffe.

List #2: Dramatic animal behavior, animals interacting, mothers and babies, well-organized groups of birds and animals that show more than a pile of feathers and fur, storytelling images

that capture the viewer's attention.

If you can previsualize, you'll be more prepared when the hoped-for situations arise.

Final Piece of Advice

Enjoy the experience. As I said, let the safari come to you. Have fun, and remember you're on holiday and you're going to bring home great photographs from what may be your first of many "trips of a lifetime" to East Africa. **OP**

Todd Gustafson owns and operates *Gustafson Photo Safari*, and he has escorted thousands of photographers to Tanzania, Kenya, Madagascar, Rwanda, Brazil, India, Costa Rica, Patagonia and Namibia. Much more information is available in his book, "A Photographer's Guide to the East African Experience" at gustafsonphotosafari.net, where you also can learn about upcoming tours.

Top DSLRs For Wildlife



The most important camera specs to consider for wildlife photography

BY THE EDITORS

While mirrorless cameras have been closing the gap, DSLRs remain the best choice for wildlife photography. The availability of extreme telephoto lenses, AF performance, fast continuous shooting rates and high ISO capabilities are all advantages for capturing animal interactions and behavior.

Full Frame or APS?

Telephoto reach is the most important requirement for wildlife photography, bringing you close to subjects without disturbing them. While full-frame cameras are in some respects superior to APS-C models, for wildlife photography, the magnification factor of a smaller sensor enhances telephoto reach. For example, comparing a 20-megapixel full-frame camera with a 20-megapixel APS-C camera, the APS-C model will give you approximately 1.5x magnification of your lens' focal length, making a 400mm lens equivalent to a 600mm lens. Keep in mind that this is only true if you're comparing two cameras with the same resolution, as a full-frame image from

a higher-resolution camera can be cropped for a similar result.

Autofocus Performance

For wildlife action, AF speed and accuracy are prime considerations. Definitive numerical ratings aren't available for AF performance, but higher-end DSLRs typically deliver better AF performance than entry-level bodies, and newer models with the most up-to-date AF technology improve upon earlier models.

More AF points are potentially an advantage, but evaluate the entire AF system. Cross-type points provide additional information to the AF processor and, therefore, improved accuracy. Algorithms and processor capabilities also play a major role—newer AF systems with fewer AF points and more powerful processors will potentially outperform older systems with more AF points. Multi-point AF is most useful when your subject is in front of a relatively uncluttered background. Otherwise, it may be more effective to simply use the center AF point, lock focus and then compose, or for stationary wildlife, to activate the AF point over the ani-

mal's eye that's nearest to the camera.

While cameras with focus-tracking capabilities can greatly enhance your chances of success, they're not infallible, so it's good to be able to fall back to basic technique and an understanding of your camera's available settings. Review your manual's recommendations for AF mode selection and experiment with your camera's AF options to see which work best for your style of shooting.

Your lens also has a significant impact on autofocus performance. The availability and number of cross-type AF points may be limited by your lens selection. Professional super-telephoto lenses have faster motors and smarter AF algorithms, as well as finer optics than lower-end lenses. They're more durable, with better sealing against weather and dust. They also cost a lot more, and are much larger and heavier—but that's the price of superior performance.

Did you know your camera's AF system operates with the lens wide open at its maximum aperture? When you activate the shutter, the lens then closes down to your selected aperture immediately before the shutter opens. Most AF systems require a minimum aperture of *f*/5.6, which usually isn't a problem. However, if you use a teleconverter to extend your focal length, you're also reducing the effective maximum aper-

ture of your lens—the stronger the teleconverter's strength, the greater this reduction—making an AF system that's compatible with apertures as small as *f*/8 preferable for telephoto work.

Frames Per Second and Max Burst

While fast continuous capture rates aren't absolutely critical for most wildlife photography, they're certainly beneficial. More frames per second increase your chances of recording the perfect expression, gesture or wing position for moving wildlife. In addition to frames per second, the number of frames that can be stored in a single burst is also important. The larger the file, the faster your camera's buffer will fill, so if large bursts of images are desired, shoot JPEG instead of RAW, as you'll be able to capture significantly more images per burst. Regardless of your selected file type, to take full advantage of your camera's speed, use the fastest-rated memory cards that your camera supports.

ISO Equivalence

For best image quality, it's always preferable to set lower ISOs, but wildlife photography often means shooting in low-light conditions near dawn and dusk when higher ISOs are needed. Considering the minimum aperture requirements of AF systems, plus the creative flexibility of selecting the right aperture for your desired depth of field, cameras that offer wider ISO ranges provide a significant advantage for wildlife photography. Though noise increases at higher ISOs, it's better to compromise with noise than with sharpness or not getting the shot at all.

More light translates to less noise, and larger sensors collect more light due to their increased surface area. That's one reason why full-frame cameras are able to offer comparably higher ISO equivalents and provide better image quality at higher ISO settings than smaller sensors.

Suggested Cameras

Following is a selection of DSLRs, both full-frame and APS-C, which we recommend for wildlife photography. While not a definitive list, these models represent the latest options from their respective makers. When selecting a DSLR, also consider the telephoto lenses and teleconverter options available for the models you're evaluating.

Canon EOS-1D X Mark II

Canon's newest professional DSLR is an excellent choice for wildlife photography. It's the fastest DSLR currently available, with 14 fps capture using the optical viewfinder or up to 16 fps when shooting in Live View. The AF system is also impressive, with 61 AF points, 41 of which are cross-type, all of which are compatible with apertures as small as *f*/8.

Sensor: 20.2 MP Full-Frame

AF Points: 61

Max Frame Rate: 16 fps

Max Burst: 170 RAW

ISO Range (Expanded): 100–51,200 (409,600)

Price: \$5,999

Canon EOS 80D

Another new model from Canon, this APS-C DSLR features a 45-point AF system, all of which may be cross-type (depending on the lens selected). The AF system is also compatible with apertures of *f*/8 or larger. Like the new EOS-1D X Mark II, the AF system can function in low-light situations down to -3 EV, which is approximately the luminance of moonlight.

Sensor: 24.2 MP APS-C

AF Points: 45

Max Frame Rate: 7 fps

Max Burst: 25 RAW

ISO Range (Expanded): 100–16,000 (25,600)

Price: \$1,199

Nikon D5

Nikon's new flagship is ideal for wildlife, promising extremely fast and precise AF, with 153 AF points, 99 of which are cross-type, and 15 that can function at apertures as small as *f*/8. The AF system also features a dedicated processor, and works in extremely low-light conditions, down to -4 EV. It can capture 12 fps using the viewfinder or 14 fps with the mirror locked up.

Sensor: 20.8 MP Full-Frame

AF Points: 153

Max Frame Rate: 14 fps

Max Burst: 200 RAW

ISO Range (Expanded): 100–102,400 (3,280,000)

Price: \$6,499

Nikon D500

The D500 includes the same new AF system as the top-end pro D5, as well as its new EXPEED 5 processor. Though it's not quite as fast as the D5, it's still very speedy at its max rate of 10 fps. It also features the same level of weather sealing as the pro-model D810, and though less than the D5's astronomical ISO max, offers a remarkable ISO range, expandable to 1,640,000.

Sensor: 20.9 MP APS-C

AF Points: 153

Max Frame Rate: 10 fps

Max Burst: 79 RAW

ISO Range (Expanded): 100–51,200 (1,640,000)

Price: \$1,999



Top DSLRs For **Wildlife**

Pentax K-1

The first full-frame-sensor camera from Pentax is built for outdoor photography, with 87 weather-sealing components. The K-1 offers a useful APS-C Crop Mode that not only allows it to accept a wider selection of Pentax lenses (and enhances telephoto reach), but also boosts the max frame rate from 4.4 fps to 6.5 fps. Pentax SR II five-axis shake reduction built in provides stabilization with every lens.

Sensor: 36.4 MP Full-Frame

AF Points: 33

Max Frame Rate: 4.4 fps (full frame)/6.5 fps (crop)

Max Burst: 17 RAW (full frame)/50 RAW (crop)

ISO Range: 100–204,800

Price: \$1,799

Pentax K-3 II

Like the full-frame K-1, the K-3 II is well protected against the elements, with 92 seals. The 27-point AF system includes 25 cross-type points and can function in low-light conditions down to -3 EV. Also like the K-1, the K-3 II has image stabilization built in, offering up to 4.5 stops of shake reduction regardless of the lens used.

Sensor: 24.35 MP APS-C

AF Points: 27

Max Frame Rate: 8.3 fps

Max Burst: 23 RAW

ISO Range: 100–51,200

Price: \$999



Sony a99

Technically not a DSLR, the a99 is built around Sony's Translucent Mirror Technology, which passes most of the light to the image sensor, but reflects a small amount to the phase-detection AF system. At full resolution, the a99 can capture at 6 fps, but you also have the option of shooting at up to 10 fps with a resulting cropped file of 4.5 megapixels.

Sensor: 24.3 MP Full-Frame

AF Points: 19

Max Frame Rate: 6 fps

Max Burst: 14 RAW

ISO Range: 100–25,600

Price: \$1,999

Sony a77 II

Like the a99, the a77 II employs Translucent Mirror Technology, though as a newer model, it offers some advantages for wildlife photography over the a99, like faster capture rates and a more sophisticated AF system with 79 points, 15 of which are cross-type. The a77 II also incorporates weather sealing around the buttons, controls and camera openings.

Sensor: 24.3 MP APS-C

AF Points: 79

Max Frame Rate: 12 fps

Max Burst: 60 JPEG

ISO Range: 50–25,600

Price: \$1,199

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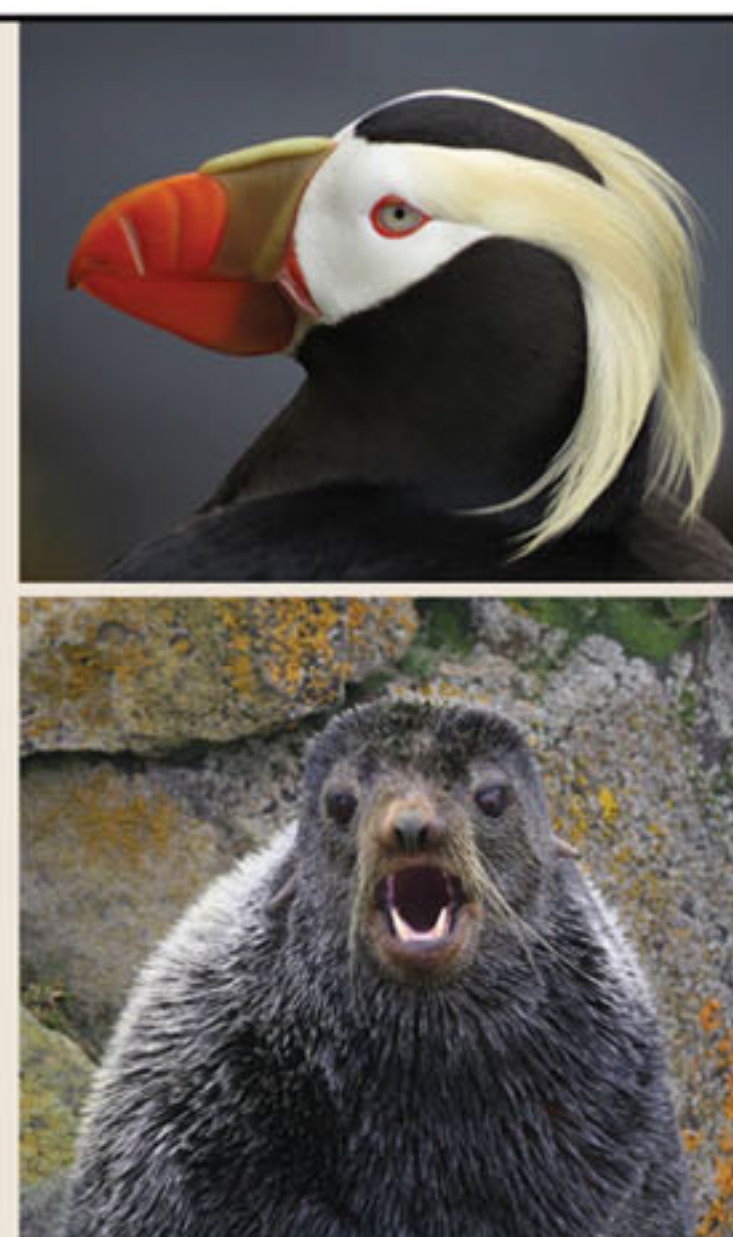


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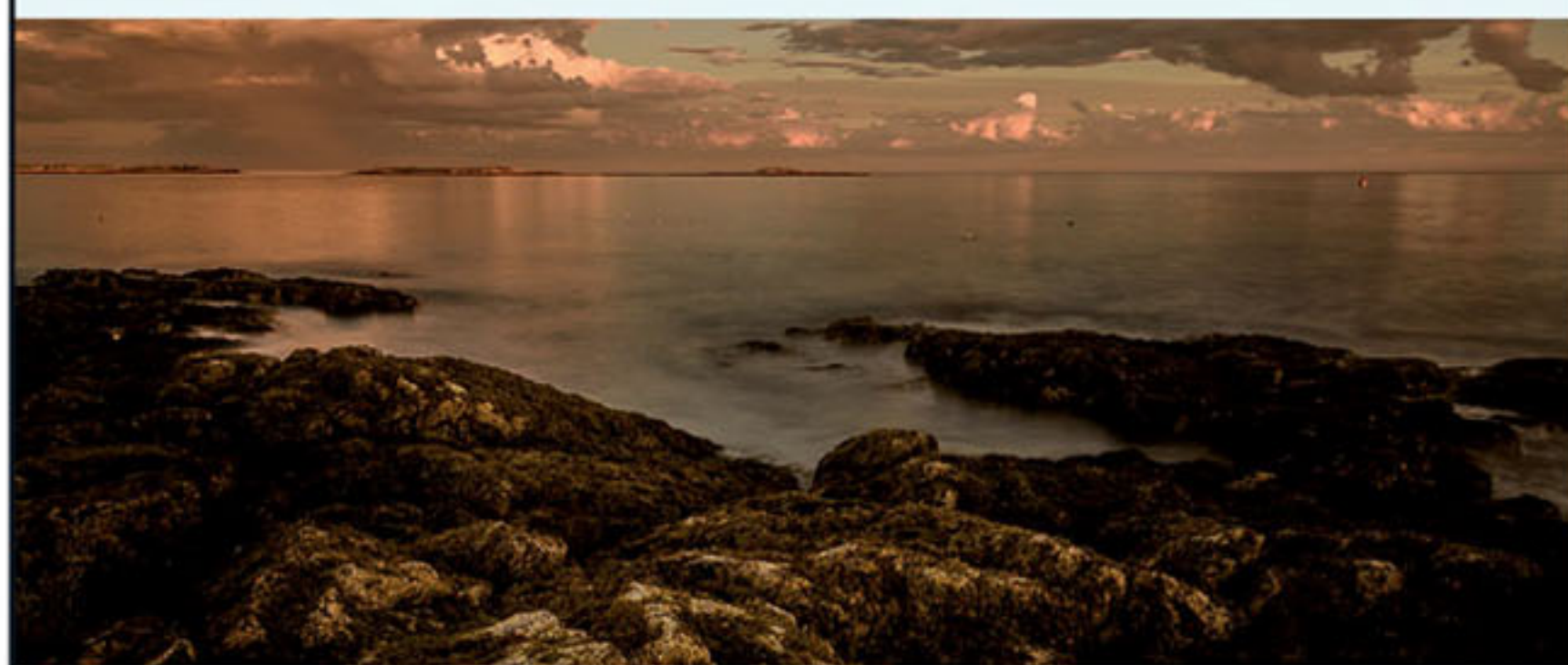
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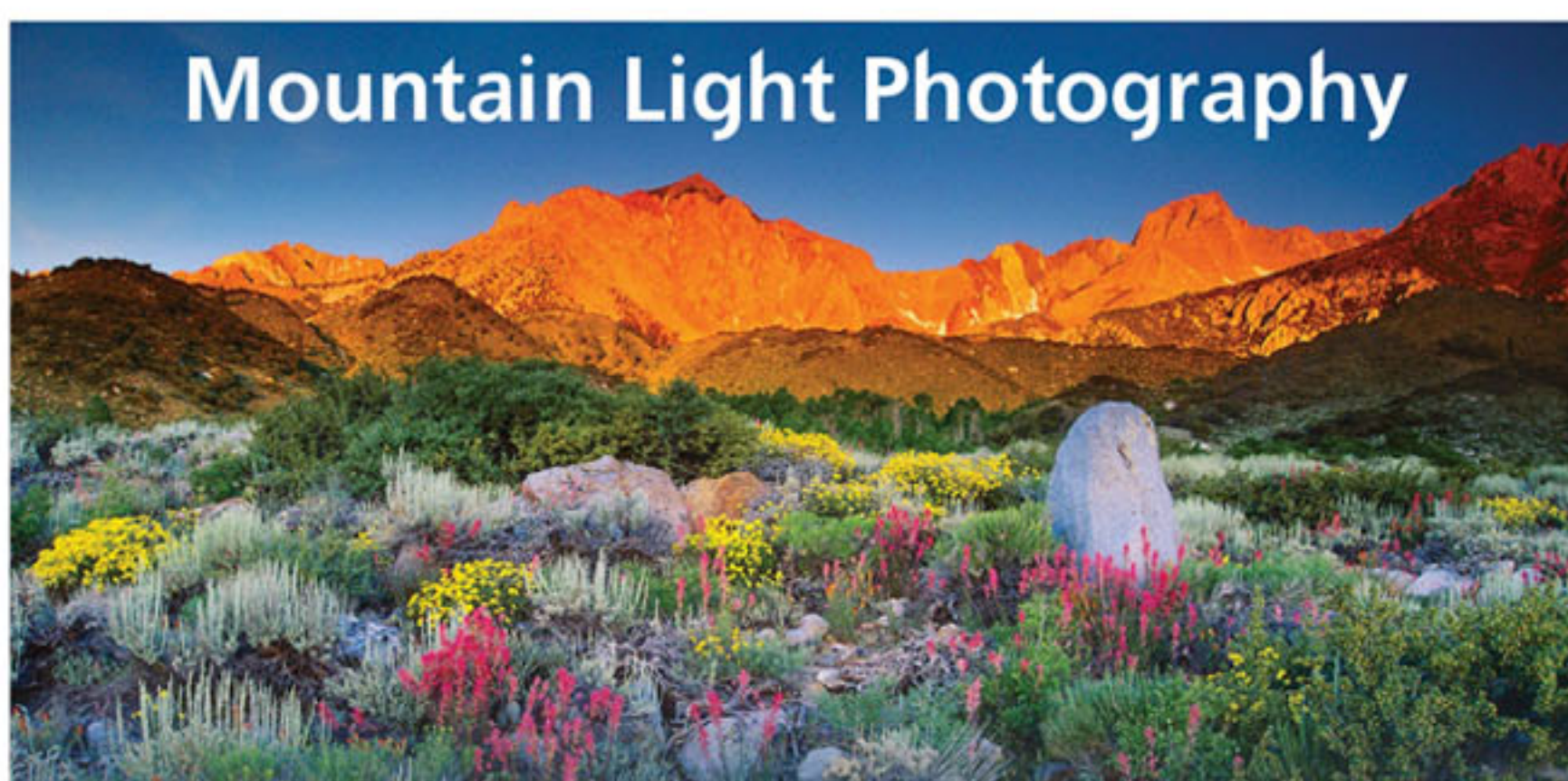
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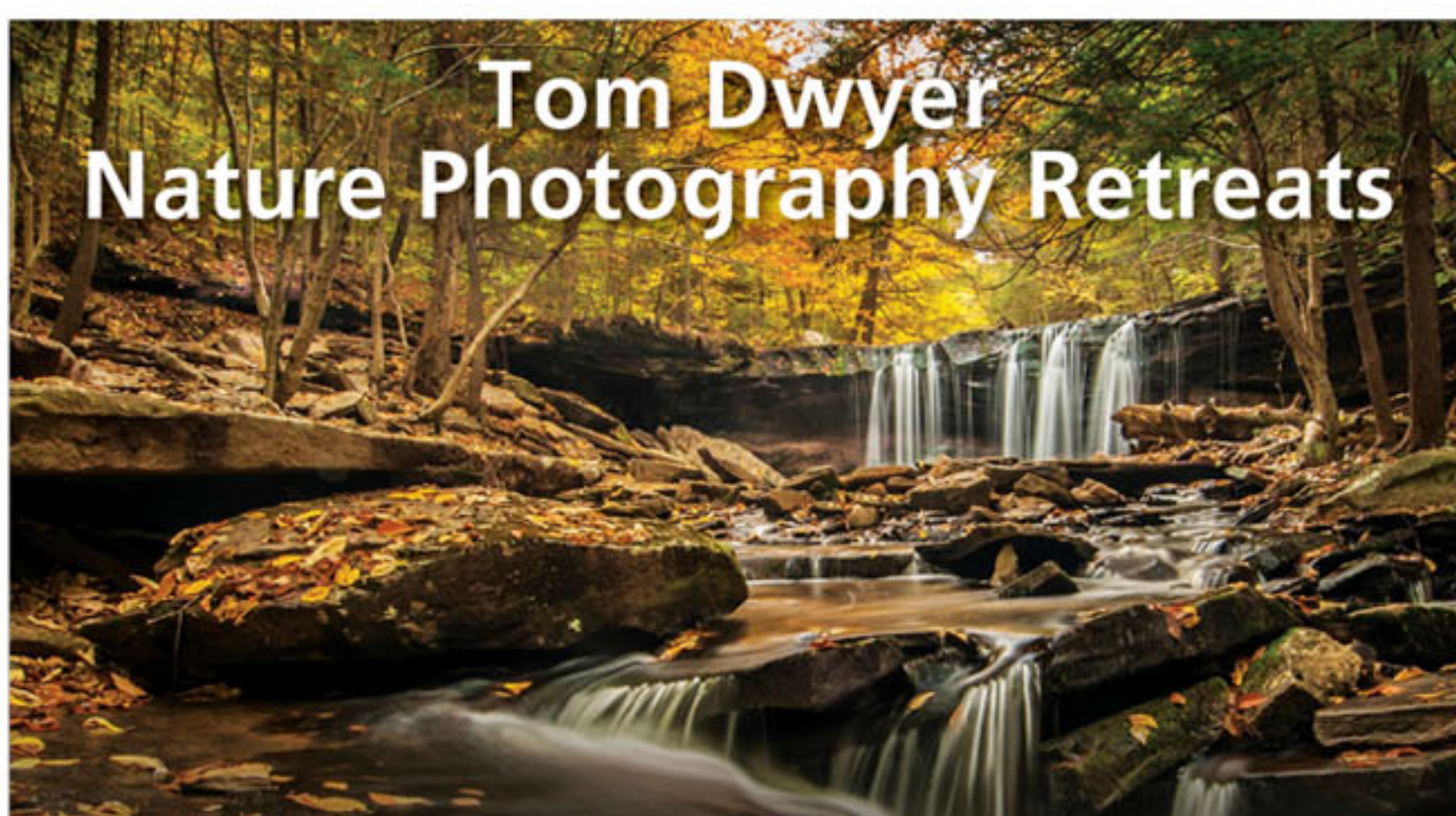
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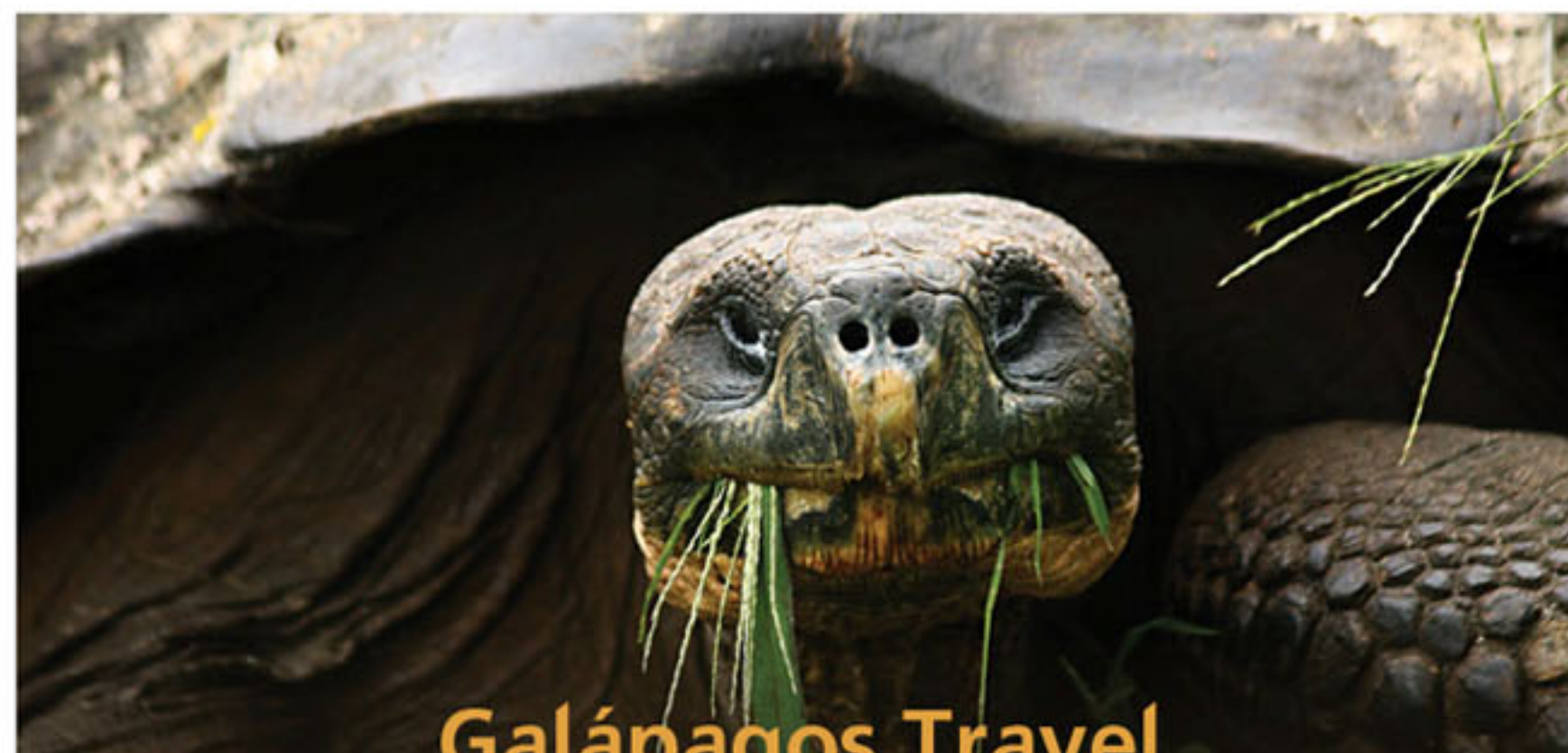
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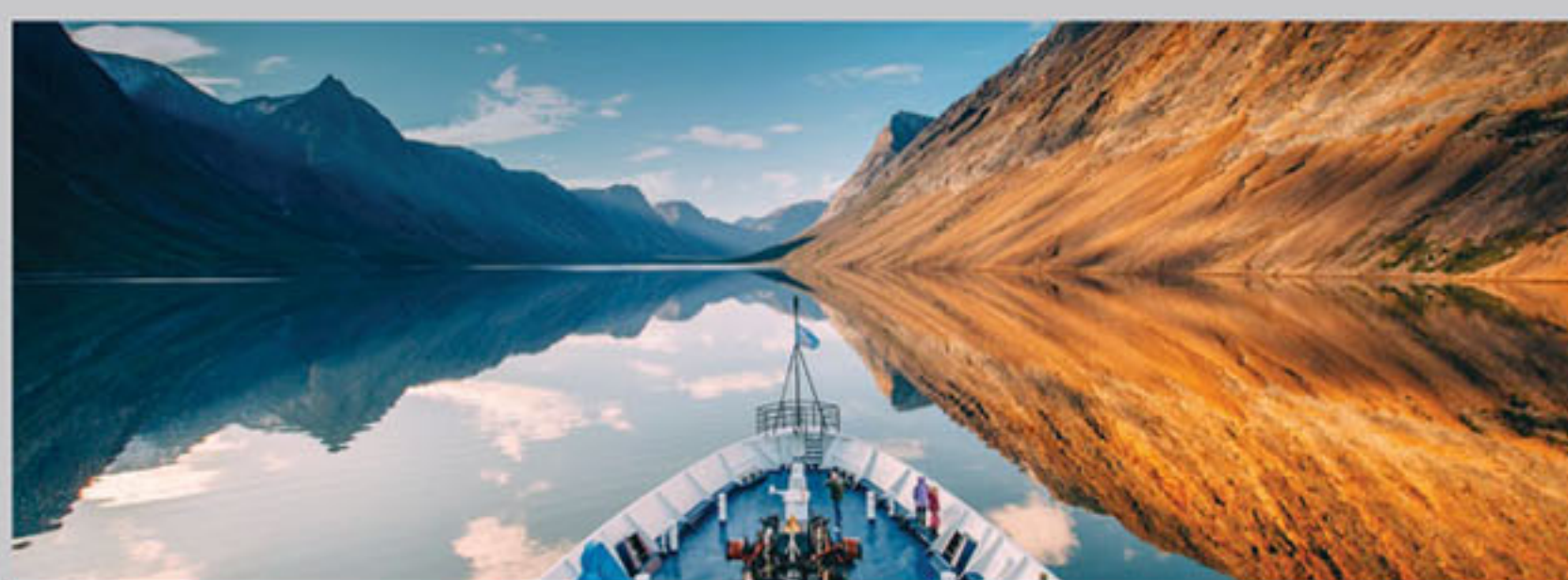
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tech tips

(Cont'd from page 26)

especially if placing well in the competition gives you a sense of validation, puts your work in the company of other accomplished photographers and publicizes your work in a context that makes you proud (being published in *Outdoor Photographer*, for example). And, as discussed, participation can be especially rewarding when the sponsoring organization is one that you strongly support.

The odds of winning are, of course, highly variable, depending on the number of entries, the number of prizes, the abilities and predilections of the judges, and the sponsor's objectives. I've judged many, many nature photo contests, from local to international in scope, and I'm always amazed by the creativity and skill demonstrated by entrants. My fellow judges and I may not completely agree on which images are the best, and that's where subjective judgments come into the mix; it's what I like to think of as the "pull" of the image, that is, how intensively it calls to the viewer.

My colleague Wendy Shattil (Dancing Pelican.com) is a top-notch organizer

of photographic contests for nature-oriented nonprofits, including the North American Nature Photography Association (NANPA) Showcase and the Audubon Society of Greater Denver's Share the View competition. Wendy won the Grand Prize of the most prestigious wildlife photography contest in the world, the BBC Wildlife Photographer of the Year (nhm.ac.uk/visit/wpy.html). For the purposes of this column, Wendy has shared some statistics from recent contests in which I participated as a judge.

The 2015 Share the View contest (denveraudubon.contestvenue.com) received 1,850 entries from around the world; 1,350 images made it to the judges: Miriam Stein, who has worked as a photo editor for the National Geographic Society and The Nature Conservancy, among other nature and conservation-based organizations; John Nuhn, photo director at the National Wildlife Federation for 34 years; and yours truly. The entry fee of \$10 per image, or 6 for \$50, funds a prize pool of \$2,500 for the top 10 finishers, with a grand prize of \$1,000, and supports the

organization's activities, including promotion of the 250 highest-rated images.

The NANPA Showcase is of very high quality. The contest typically generates about 2,500 entries. Each NANPA member may submit one free entry; additional submissions are \$10 each, or 6 for \$50. Of these, about 10% receive recognition, \$3,400 in prize money is shared among 15 winners with five top prizes of \$300, and the best 100 images are featured on the NANPA website (nanpa.org).

The Windland Smith Rice International Awards Competition is another highly respected contest. Organized by Nature's Best Photography (naturesbestphotography.com), the website reports some 25,000 entries are received each year. Photographers may enter up to 20 images for \$25, and the winners are honored by publication in the Special Collector's Editions of the magazine and exhibition at the Smithsonian's National Museum of Natural History. No prize money, but winning sure can make you (and your mom) proud! **OP**

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\$1,995⁰⁰

C Nikon AF-S NIKKOR 300mm f/4E PF ED VR
#NI3004E
\$1,996⁹⁵

D Oben CT-2491 CF Tripod and BC-166 Ball Head
#OBCT2491K2
\$669⁹⁵

E Sony Alpha A7S Mirrorless Camera
#SOA7SB
\$2,198⁰⁰

F Zeiss 135mm f/2 APO Sonnar T* ZF.2 Lens
#ZE1352ASZFN
\$2,122⁰⁰

G Litepanels Astra 1x1 Bi-Color LED Panel
#LIA1X1BC
\$1,350⁰⁰

H Canon EOS 5DS DSLR Camera
#CAE5DS
\$3,699⁰⁰

I Panasonic Lumix DMC-GH4 Camera with Interface Unit
#PADMCGH4BK
\$2,297⁹⁹

J 3DR Solo Quadcopter Drone (No Gimbal)
#3DRSOLO
\$999⁹⁵

K Nikon D750 DSLR Camera with 24-120mm Lens
#NID75024120
\$3,396⁹⁵

L DJI Inspire 1 Quadcopter 4K Video and 3-Axis Gimbal
#DJINSPIRE1
\$2,899⁰⁰

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An Electrifying Encounter

On a stormy afternoon in July, Verdon Tomajko traveled to Mount Evans, one of the 14,000-foot mountain peaks in Colorado, where he came across some baby goats playing. "Soon the lightning started," he recalls, "and the baby goats started to get very anxious, running and jumping over the rocks, and over each other, with nervous energy from the incoming storm. Despite the potentially hazardous conditions, I wanted to keep shooting, waiting to get this perfect shot with the goats pausing on a rock and a lightning strike in the background. You can see the hair on the goats standing up from the electricity in the air. I kept shooting until my hair was also standing up on end and the sky was nearly dark. I love to capture behaviors and personalities of wildlife, and this was one of the best shooting opportunities that I've had." To see more of Verdon Tomajko's work, visit verdonrocks.com.





©André Costantini Focal Length: 375mm Exposure: F/16 1/400

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Charles Glatzer knows that in the backcountry, the unexpected and awe-inspiring can happen in an instant. Everything from the wildlife to the weather is unpredictable. But with an EOS 7D Mark II and patience, he's ready to discover and capture the majestic moments of nature that most people will never witness. Stay focused. Be creative. Canon is with you every step of the way.

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